

The Iron Age

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A New Regenerative Hot-Blast Oven.*

BY JOHN C. LONG, E. M., MECHANICSBURGH, PA.

The advantages of fire-brick regenerative hot-blast ovens being thoroughly appreciated by those engaged in modern blast-furnace practice, the important question now is to obtain the best and most efficient apparatus. The apparatus invented by the writer, and described in this paper, is proposed as an improved form, retaining all the advantages of those now in use, with the additional ones of a cheaper construction and of being able to furnish a very much hotter blast and to vary and control the temperature thereof up to the limit of the resistance of the refractory materials composing the ovens. To the practical blast-furnace manager the ability to control perfectly the temperature of the blast, so that an error of filling or a variation in the calorific power of the fuel may be corrected by suddenly and markedly changing the temperature of the blast, is a great desideratum. By this means the working of the furnace can be rendered much more economical and certain, and the grade of the iron more uniform, than by waiting to correct the furnace by a change of burden. This object is sought to be accomplished with the iron-pipe ovens and the regenerative brick ovens now in use, by keeping the temperature of the blast somewhat below the maximum; but, as the range of variation is only slight and the temperature comparatively low, the resultant benefit is consequently small. With the apparatus described in this paper, the blast may be regularly kept much hotter, and yet its temperature may be at any moment quickly and greatly raised.

Heretofore it has been customary to heat regenerative ovens by burning in them blast-furnace gas the initial temperature of which is that which it had when leaving the tunnel-head less what it has lost in its transmission to the oven in which it is burned. This temperature varies from 100° for charcoal and 228° C. for coke (according to Kerl) upward, being lower as the furnace is economical of fuel. At the Mont Alto, Pa., Charcoal Furnace, which I have personally managed for the last three blasts, the gas temperature ran very low. During the last two months (November and December) of the blast of 1884 the gas temperature and pressure were taken every hour, and the former averaged for this time, including the last half-day blowing out, 218° F., or, excluding the blowing out, 210° F. For the 8 days from November 20 to 28, 1884, it averaged only 117° F. So cool was the gas that the vapor of water in it was condensed in the gas flue and dropped out at quite a lively rate at the expansion joint, not more than 8 feet from the furnace. The temperatures were taken from a pyrometer kept in the gas flue, and frequently by the writer, with a mercury thermometer held in the gas flue.

Since the cooler the gases can be made to leave the blast furnace the better and more economically the furnace works, the tendency of modern practice is to reduce the temperature of the waste gases as much as possible, and thus have the furnaces work with "cool tops." As a consequence of working cool at the top less of the carbonic acid formed in the lower part of the furnace is reduced to carbonic oxide in the upper part at the expense of the fuel charged; and hence the escaping gas has less heating power, since it contains a greater proportion of nitrogen and carbonic acid, the heat-absorbing elements, and a smaller proportion of carbonic oxide, the principal heat-producer. This decrease in the calorific power of the blast-furnace gas was very markedly shown at the Mont Alto Furnace during the last blast. When the furnace was carrying a burden of 2000 to 2100 pounds of ore and 500 to 525 pounds of limestone, on 720 pounds of charcoal, it was with the greatest difficulty that steam could be kept up and the blast heated to 550° to 600° F. by means of the gas, while with a lighter burden there was a surplus of gas, the quantity of blast entering the furnace being the same in both cases; hence, if an intensely hot blast is to be supplied to an economically-working furnace, means must be taken to heat the gas, the subsequent combustion of which is to heat the blast ovens.

In the regenerative hot-blast ovens now in use the air for burning the gas is either employed at atmospheric temperature or is heated by being caused to flow through passages in the walls of the combustion chamber immediately surrounding the flame; but it is evident that no advantage is gained from the latter arrangement, since the heat that the air for combustion carries to the flame has been taken from the flame by the walls through which it passes, and hence there is no increase in either temperature or quantity of heat, whereas, by burning the highly-heated gas with highly heated air which has been heated otherwise than by the oven in which it produces combustion, the heat which this air carries is added to that carried in and produced by the combustion of the highly-heated gas, and a great increase of temperature is produced over that resulting from the combustion of cool gas with cool air, or of gas burned with air heated in the oven in which it produces combustion.

* A paper read before the American Institute of Mining Engineers.

The apparatus proposed to secure these results consists in three of the regenerative hot ovens, arranged, as in Fig. 1, along hot and cold gas and air mains, so connected that each oven can be used as desired, either for heating the blast or for heating the combustible gas after it has left the blast furnace and prior to its being burned to heat the apparatus. Since the oven which is heating the blast will, after it has parted with all the heat which is effective to produce a blast of the desired temperature, yet contain a vast amount of heat, but of a lower temperature, the blast oven can be used, with-

arithmetical ratio, it follows that an oven will become much more highly and quickly heated by this intensely hot flame than if the same quantity of heat were produced at a lower temperature by burning cool gas with cool air or air heated by the oven in which it produces combustion. And the time required to heat the oven will become so much shortened that the time required for the blast oven to part with its effective heat will be sufficient to heat the oven in which the gas is being burned.

Referring to the accompanying drawings, Fig. 1 is a plan of three ovens and connec-

and most highly heat the middle, while the blast, owing to the greater resistance to its flow in the hotter part, takes the cooler sides of the oven. Thus the oven is not operated to the best advantage.

The flues in the regenerator portion of the compartments are arranged, as in Fig. 2, in sets forming a decreasing series from the combustion chamber, so that, as the products of combustion impart their heat, become cooler and contract, the areas of the flues and heat-absorbing materials decrease, and, conversely, when heating the blast the area of the flues and heat-imparting materials in-

formed of flat-arch blocks, R, resting on the walls E and covered by strips of sheet iron, as shown in Figs. 1 and 2. The walls are formed of ordinary 9-inch fire-brick or similarly shaped blocks laid diagonally in reverse directions in adjacent courses, as shown in Fig. 3, thus providing for expansion and contraction, as the bricks are free to expand into the flues and cannot transfer their linear expansions to the sides of the oven (as in walls of the ordinary construction) while the lateral expansion has a tendency only to turn the bricks to a greater angle. Moreover, by this construction the heating surface is made nearly one-half greater than for a similar wall having a plane surface. The wall is also much stronger than when laid in the ordinary manner, and hence can be made much lighter. As the depth to which the heat penetrates and is given off is supposed to be from 1½ to 2 inches, the whole of the material of the bricks can by this construction be made effective for absorbing and giving out heat. Hence a much smaller oven can do more work than a large one with plain walls.

The air for combustion is either admitted at atmospheric temperature by means of valves, C, or is taken from the hot-blast main H, or parts in free communication with it by means of valves, F, and is introduced through pipes, P, Fig. 2, into the air-cylinder O, having holes so arranged that the air jets shall be perfectly distributed through the gas. The valves used are positive-motion seat-valves, having a continuous coil of pipe through them, so that by increasing the pressure of the water or passing a jet of steam through them any sediment may be readily removed. The seats are similarly provided and firmly fastened to the valve casing to keep them properly in place.

The method of working a plant consisting of three of the above-described ovens (as in Fig. 1) which are used for heating the blast and preheating the combustible gas, without being themselves heated specially for the latter purpose, and in which the gas is burned with hot air, is as follows: All valves being closed, open in oven I the cold-blast valve D, then open the hot-blast valve S, thus having blast pass through the oven and into the hot-blast main. Then open in oven K the cold-gas valve U, and then open the gas-valve T, so that gas will pass through the oven and into the hot-gas main formed by closing the valve W between the ovens and the blast-furnace. (When W is open this main can be used as ordinary gas-main to supply the ovens with gas directly from the blast-furnace.) Then open in oven L first the chimney-valve M, next the gas-valve T, to admit the gas to be burned, then the hot-air-supply valve F, to furnish air for combustion, and ignite the gas through the eye-hole or dust door. After a suitable interval the apparatus is reversed, always commencing with the oven which is being heated by putting it on blast, then put the oven which had been on blast to heating gas, and put the oven which is heating gas to being heated by burning gas. Thus, in oven L, which is being heated, close the gas-valve T and air-valve F, and then close the chimney-valve M and open the cold-blast valve D and hot-blast valve S, and have hot-blast pass into the hot-blast main and to the furnace. Then in oven I (on blast) close the hot-blast valve S and cold-blast valve D, and open the air-escape V (or the cold-air valve C, which can also be used for this purpose) to allow the compressed air to pass out, after which it is closed again. Then open the chimney-valve M and the gas-valve T, and, after a sufficient interval to allow the air in the oven to pass into the chimney and the oven to be filled with gas (in order to avoid the danger of an explosion from a mixture of air and gas in the oven and hot-gas main), close the chimney-valve M and open the cold-gas valve U, and let hot gas pass into the hot-gas main. Then in oven K (on gas) close the cold-gas valve U and open the chimney-valve M and the air-valve F to supply hot air for combustion. After the oven which is heating the blast has parted with its effective heat or the oven which is being heated has become sufficiently hot the apparatus is again reversed in the manner and with the precautions above described.

After the first reversal the apparatus is heated by burning cold gas with hot air, and, hence, in an equal interval the oven which is being heated will become several hundred degrees hotter than did the oven which was first heated by burning cold gas with cold air, and after the second reversal will furnish a blast several hundred degrees hotter than before, while the oven through which the gas is passing will heat it several hundred degrees hotter than it was when it came to the apparatus and the oven which is being heated by burning this heated gas with hotter air will in an equal interval become hotter than before and after reversal will furnish still hotter blast to the furnace and for the combustion of still hotter gas, thus developing after each reversal a higher temperature of blast, provided the quantity of blast and gas are properly proportioned to the apparatus.

The regenerative hot-blast apparatus now in use can be readily altered to this improved system, as is shown in Fig. 5, for a plant of three Whitwell ovens by putting a valve W, in the gas-main between the ovens and the blast-furnace, thus forming a hot-gas main of the portion cut off, and also placing at the cool or chimney side of the ovens a

(Continued on page 5.)

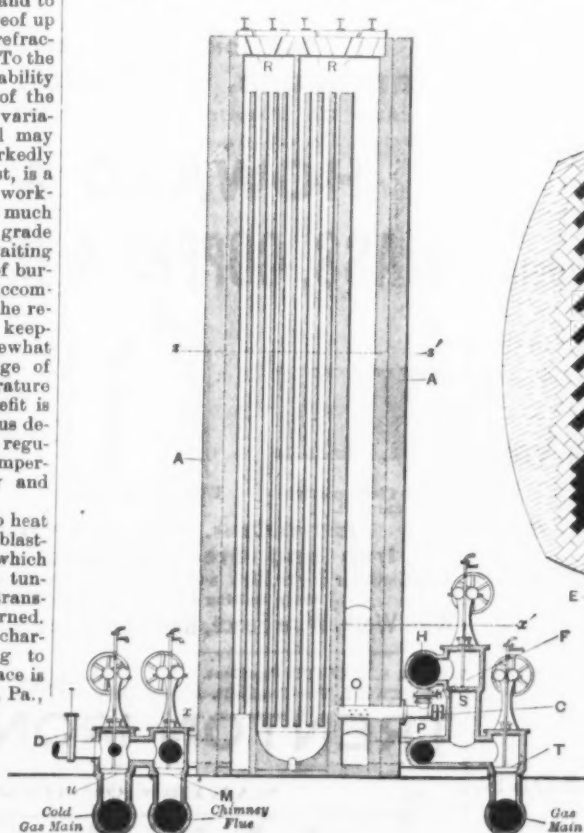


Fig. 2.—Vertical Section.

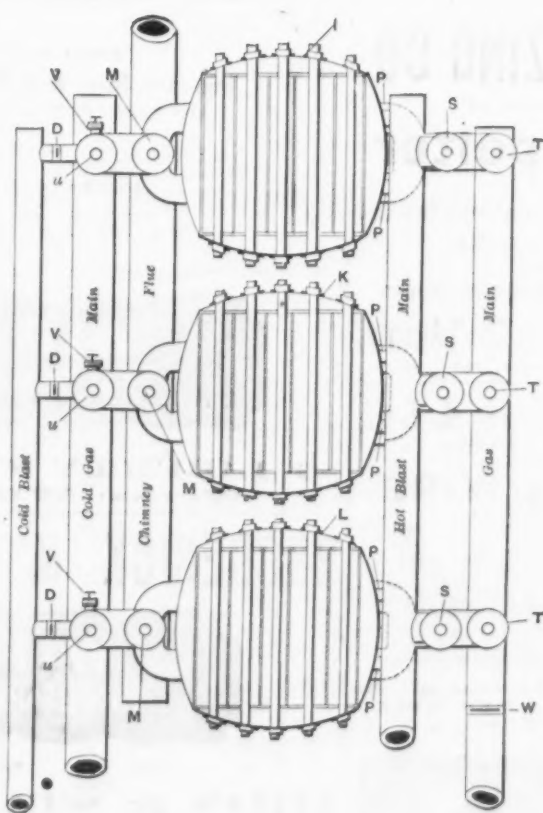


Fig. 1.—Plan.

THE LONG REGENERATIVE HOT-BLAST OVEN.

not being specially heated therefor, to heat the combustible gas to nearly the temperature of the blast, because the quantity of gas is much less than that of the blast and the specific heat is about the same, while the heat-absorbing power is greater. The air for combustion is either used at the atmospheric temperature or it is taken from the hot-blast main, or parts in free communication with it, so that this hot air is heated otherwise than by the oven in which it produces combustion. Thus we command the advantage of heating the apparatus by means of highly-heated gas burned with air at atmospheric temperature, or highly-heated air, and thereby producing a most intense temperature and greatly increasing the efficiency of the apparatus. For, as the rate of cooling of a heated body increases in a geometrical ratio when the temperature increases in an

arithmetical ratio, it follows that an oven will become much more highly and quickly heated by this intensely hot flame than if the same quantity of heat were produced at a lower temperature by burning cool gas with cool air or air heated by the oven in which it produces combustion. And the time required to heat the oven will become so much shortened that the time required for the blast oven to part with its effective heat will be sufficient to heat the oven in which the gas is being burned.

As the blast becomes heated and expands. As the rate of expansion and contraction of all gases is the same as that of air, the velocity is thus kept uniform throughout the oven and the friction decreased, both when heating the blast or gas and when heating the oven. This arrangement of the flues is an important matter, as air or gas expands or contracts 1½ of its volume at 32° F. for each degree F. the temperature is raised or lowered, so that the volume of a given weight of air at 579° F. is double, at 1098° F. three times, at 1617° F. four times, and at 2136° F. five times what it is at 60° F.

The compartments are either single or double, and each has separate gas, blast and chimney connections, so that it shall become equally heated and shall have an equal quantity of blast or gas to heat. The roof is

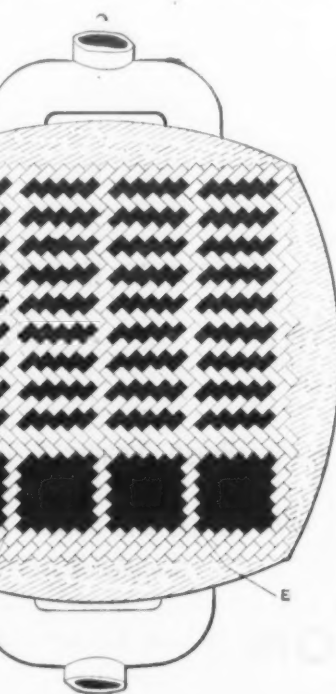


Fig. 3.—Horizontal Section.

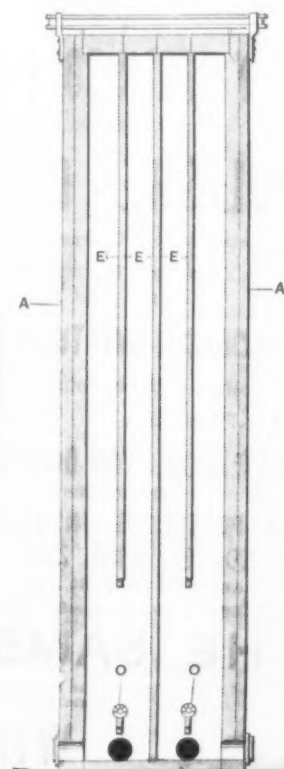


Fig. 4.—Section Through Combustion Chambers.

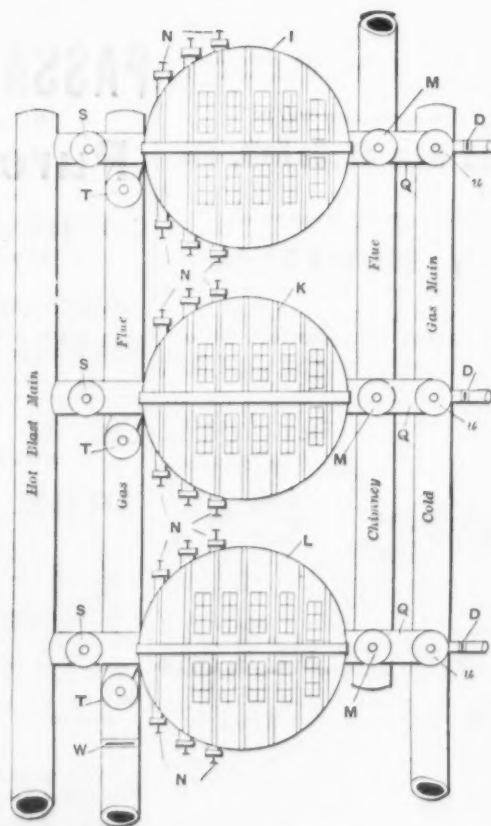


Fig. 5.—Plan for Altering.

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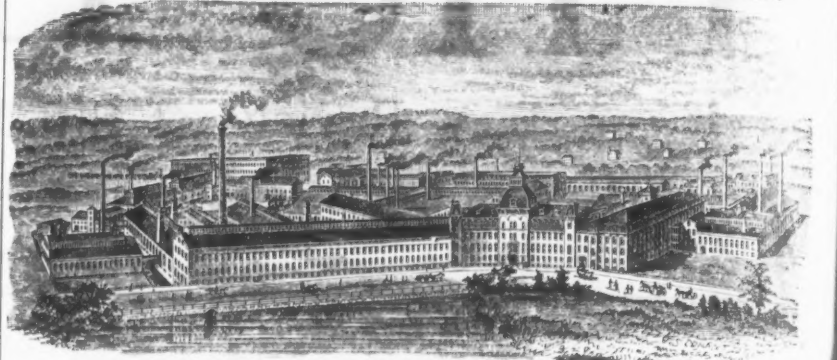
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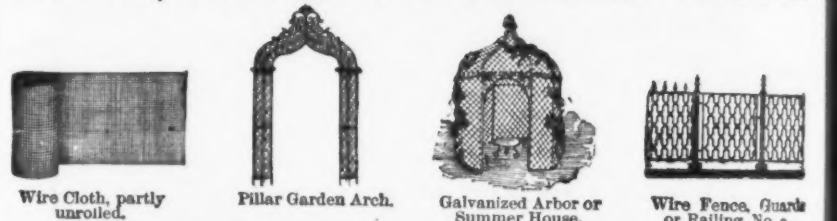
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CHARCOAL PIG IRON,
Also
WOODBIDGE CLAY MINING CO.'S FIRE BRICK.

(Concluded from page 1.)

cold-gas main having connections, Q, and
provided with valves U, to admit the gas to
be heated prior to its being burned to heat
the apparatus. The air for combustion is
admitted through the usual valves N. The
Siemens-Cowper ovens can be similarly
altered, and the method of working is the
same as above-described for the special
ovens, with the exception that the air for
combustion is admitted through valves N,
instead of from the hot-blast main. Thus,
at a slight cost, the efficiency of the present
regenerative hot blast apparatus can be
markedly increased. The apparatus can
also be arranged with four of the
above-described ovens, two of which
can be used for heating the blast and
two for heating the gas. In this case the
reversal is simpler, and it will not be neces-
sary to take the same precautions against
explosive mixtures of gas and air. In the
blast ovens the hot-air valves F, after being
properly set, are left open, both when the
oven is being heated and when it is on blast.
The apparatus can also be arranged to use the
gas without heating it prior to its being
burned by opening the valve W, when the
method of working is the same as in ordinary
regenerative apparatus, excepting when air
for combustion is taken from the hot-blast
main. Finally, the air for combustion can
be used at atmospheric temperature by em-
ploying valve C instead of the valve F.

To sum up: This apparatus can be worked
as an ordinary regenerative hot-blast appa-
ratus by heating it by burning therein cool
gas with cool air, and then the operator will
have in reserve the increase of temperature
due to burning cool gas with hot air, or hot
gas with cool air, or the further increase due
to burning hot gas with hot air. Or the appa-
ratus may be worked to produce a hotter
blast than the above by heating the gas prior
to its being burned, and burning it with cool
air—i. e., at atmospheric temperature—and
the operator will then have in reserve the
further increase due to burning hot gas with
hot air. Or, finally, the cool gas can be
burned with hot air, and the increase of tem-
perature due to heating the gas and burning
it with hot air may be held in reserve. Of
these three systems the second is, in my
judgment, to be preferred.

LATEST LEGAL DECISIONS.

TRADE-MARK—VIOLATION.

In the case of the New Haven Rolling
Spring Bed Company vs. Farren, the Su-
preme Court of Errors of Connecticut,
through Judge Carpenter, laid down the rule
under which an injunction will be granted
for the violation of a trade mark. He said:
"In order to justify an injunction restraining
a party from using a trade-mark, the name
of a corporation, partnership, or individual,
or other device descriptive of his goods, it
should appear that he is, in fact, so using it
as to represent or induce the belief that the
goods which he manufactures or sells are
the goods of the plaintiff; and that pur-
chasers do so believe, or, at least, that there
is danger that the plaintiff will in that man-
ner be defrauded."

SHIPPING—LIEN FOR FREIGHT.

L. shipped goods without any agreement
that they should be liable to the terms of the
charter party, to which he was not a party.
The captain refused to give bills of lading in
the ordinary form, but insisted that the con-
ditions of the charter party should be in-
cluded, and that, especially, the stipulation
"lien for freight, dead freight and demur-
rage" should be added. The return of
goods were demanded on the refusal to give
the bill of lading, but the captain declined
to do this, and suit was brought for the
goods and for damages. The plaintiff was
defeated, and carried the case—Leisy vs.
Buyers—to the Supreme Court of Louisiana,
where the judgment was reversed. Judge
Fenner, in the opinion, said: "Third parties
shipping without notice of the charter-
party are not bound by its terms, unless
they have notice of it; and if their goods
have gone on board they are entitled to clean
bills of lading or the return of the goods.
The vessel would have no lien upon the
cargo shipped by third persons unless they
had expressly or impliedly consented thereto.
Indeed, even when the bill of lading con-
tains express reference to the charter party
the rule seems to be that in order to charge
the shipper or indorsee of the bill with any
obligation other than the payment of freight,
plain words to that effect should be used.
The touchstone of the present controversy
lies in the determination of the question
whether or not the plaintiff, expressly or
impliedly, assented to these conditions of
the bill of lading. If he did, the vessel had
the right to require him to accept bills of
lading making such conditions effective, and
was not bound to incur the labor, expense
and inconvenience of unloading the goods.
If, on the other hand, the goods were re-
ceived without such consent, the vessel was
bound either to sign clean bills or to return
the goods."

FIRE INSURANCE.

Lessees of a plantation built a ginhouse on
it, and agreed with the lessor that he should
take it from them at a fair valuation at the
termination of the lease. This ginhouse was
burnt during the tenancy, and suit was
brought by lessees to recover on their policy
of insurance. The company defended, on
the ground that the plaintiffs had no insur-
able interest in the building, that it was the
property of the landlord, and also on the
further ground that the plaintiffs had not
disclosed their true interest in the building.
In this case—Allen vs. Sun Mutual Insur-
ance Company—the plaintiffs were defeated,
and appealed to the Supreme Court of Louisi-
ana, where they were successful. Judge
Manning, in the opinion, said: "The plain-
tiffs had an insurable interest in the gin-
house, as the landlord could acquire no com-
plete title to it until he should have paid for
it at the end of the lease. The statement of
the plaintiffs that they were the owners of
the building and its machinery was a true
statement of the interest."

STATUTE OF LIMITATIONS.

M. sent a promissory note to E. for collec-
tion in April, 1877, with instructions to col-
lect and remit, less his fees for the service.

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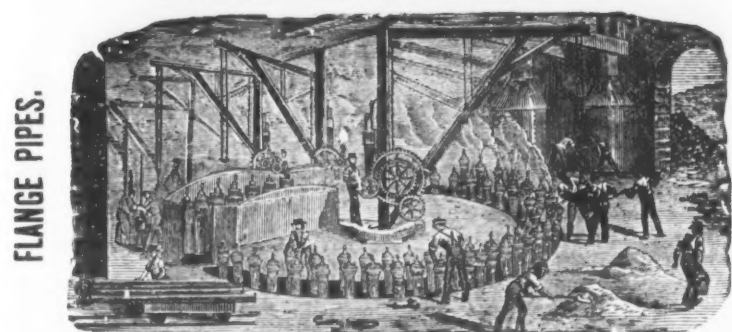
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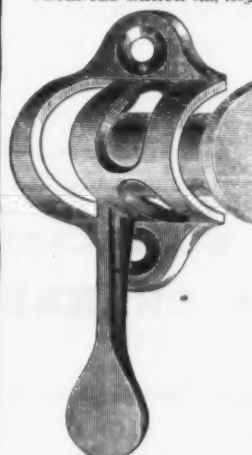
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IMPROVED
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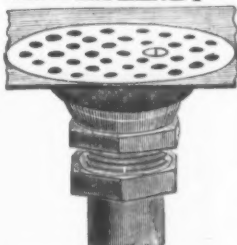
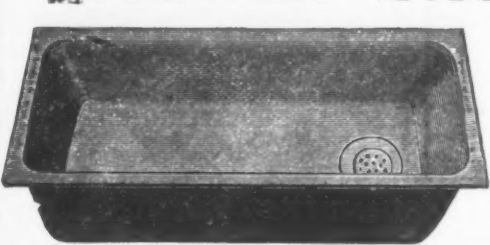
FIG. 120.



FIG. 209.



FIG. 70.

**Wrought Steel Sinks.**

One of the strong points of these sinks is the new coupling with which they are now supplied and which is pronounced by all plumbers the best on the market. It is used with both lead and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping out the pipe. The strainer and all parts of the coupling are tinned, and are furnished with all sinks without extra charge.

The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses which have been interested in the common article have taken up the Wrought Steel Sink. Twenty-five per cent. is saved in freight by purchasing Steel Sinks. Orders come from all parts of the United States, Canada, Europe and Australia.

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Plain and Ornamental Butts.

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Drilled and Wire Jointed, Japanned, Figured Enamelled, Nickel Plated and Real Bronze Butts.

Also a Full Line of

IRON AND BRASS PUMPS,

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We beg to call the attention of Architects, Builders, Dealers, and all interested parties, to our Spiral Spring Hinge, knowing it to be an effective and durable one, neat in appearance, easy to put on, and not liable to get out of order. The Springs are made from wire made expressly for us and for this particular purpose, with the view of great elasticity, durability and power. They produce a continuous pressure from the point where the door is wide open until it is closed, and then hold it perfectly in position. It has a solid pin in connection with short hollow ones, causing little or no friction, the whole power of the Spring being exerted in swinging the door. It is Fast Joint, and can be used for either right or left hand, allowing the dealer to carry less stock, and the builder will never get the wrong hand.

FINE CASTINGS A SPECIALTY.

New Britain, - Connecticut.

Warehouse: 98 Chambers St., New York.

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THE E. & G. BROOKE IRON CO.,
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MANUFACTURERS OF

ANCHOR NAILS AND SPIKES. BRAND

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Made from their own Pig Iron, insuring Regularity and Superiority in Quality.

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CUT NAILS, BAR IRON.Address **R. E. BLANKENSHIP,**

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IRON AND STEEL DROP FORGINGSAll shapes, small and large, including
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SADDLERS' ROUND AND HEAD KNIVES.**WILLIAM ROSE & BROS.,**

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NATIONAL HARDWARE & MALLEABLE IRON WORKS,

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THOMAS DEVLIN & CO.,

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For House Doors, Car Doors, Elevator Doors.
Frictionless. Indestructible. Perfect. Send for Circular.
COHOES IRON FOUNDRY MACHINE CO., COHOES, N. Y.

This note was collected in September, 1877, by an agent of the collecting agent, but no remittance was made to the plaintiff, who did not sue his agent, however, until after the expiration of six years from the date of the collection. He was not informed of the collection for some years. The trial court decided against the plaintiff and he appealed the case—Mast vs. Easton—to the Supreme Court of Minnesota, where the judgment was affirmed. Judge Dickinson, in the opinion, said: "The decisions are conflicting as to the conditions under which a right of action exists in favor of a principal against his agent for the recovery of money collected by the latter, and as to the time when the statute of limitations commences to run with respect to such an action, but it may be stated generally that when the case has been such that it has been considered that the duty had become fixed upon an agent to remit or pay money collected by him, a neglect to perform that duty has been held to render the agent liable to an action, and hence that the statute would then commence to run; and, independent of authority, the correctness of such a proposition is self-evident. The fact that the principal did not know when the collection was made, and hence did not know that the defendant had failed in the performance of his duty and that a right of action had accrued did not prevent the operation of the statute, there being no fraudulent concealment on the part of the defendant. Except where relief is sought on the ground of fraud, the statute provides no exception in favor of those who may be ignorant of the cause of action. The period within which the action must be brought commences when the right of action accrues."

TRADE-MARK.

A., who was engaged in the clothing business in Louisville, designated his store as "Tower Palace," and put up a fine sign with these words on it; the landlord paid one-half of the cost of this sign, and when A. removed to another store the sign was kept on the building. K., another dealer in clothing, then occupied the store, and in his advertisements used this term to show his store. A. filed his bill in equity against K. to compel him to remove the sign, and to restrain him from using the words "Tower Palace" in his advertisement or otherwise to designate his store or business. He was defeated, and carried the case—Armstrong vs. Kleinhaus—to the Court of Appeals of Kentucky, where he was again defeated. Judge Lewis, in the opinion, said: "If A. had a personal right to the name, the use and appropriation of it by K. in carrying on the same business in the same store must be regarded as deceptive and an unlawful injury to his business. If, on the contrary, the name was originally intended and used to designate the building, the sign upon the tower is not deceptive, nor is the advertisement by K. of his place of business as being 'Tower Palace,' No. 150 West Market street, untrue, and there is no ground for an injunction shown. It appears that the landlord contributed to the cost of this sign and intended to name the building 'Tower Palace' because of its appearance. In a recent case it has been decided that it is fair inference from the numerous authorities in the name of the establishment itself where the manufacture is carried on and becomes attached to the manufactured article only as the product of that particular establishment, a sale of the establishment will carry with it to the purchaser the exclusive right to use the name it had previously acquired in connection with his own manufacture at the same place of a similar article, by operation of law. Here the name of 'Tower Palace' was intended to describe and designate the place and not the particular business, nor the person carrying it on. It never was used as a trade-mark by A., but simply to indicate the particular place on Market street where he did business, and, consequently, he never acquired the exclusive right to use the name except as applicable to, and while he occupied, that particular building."

FIRE INSURANCE.

A junk dealer insured his stock "of rags, old metals, boxes and barrels" contained in his storehouse, and on the trial of the suit brought by him to recover on his policy, the company refusing to pay the amount he claimed, he was allowed to show the meaning in the trade of "rags" and "old metals." Their meaning was broader than the words signified in their common use. The verdict was in accordance with this proof, and the company carried the case—Mooney vs. Howard Insurance Company—to the Supreme Judicial Court of Massachusetts, where the exceptions taken were overruled. The Chief Justice (Morton) in the opinion, said: "It was competent for the plaintiff to prove that, by a usage which was not a particular or local usage, but one general in the trade, the signification of these terms, 'rags' and 'old metals,' was broader than the words carried in their ordinary use. The court instructed the jury: 'The plaintiff must prove that the alleged usage was known to the defendant, and you will be warranted in finding that it was known to the defendant, if you find upon all the evidence that there was such a usage or custom, and that it was well defined, universal, uniform and of long continuance.' We understand this to mean that the jury might infer the knowledge of the defendant from the universality and long existence of the usage. A usage such as these instructions required having been proved, the defendant's contract is deemed to have been entered into with reference to such usage, if known to them. Underwriters insuring by certain words may fairly be presumed to know the mercantile meaning of those words; and the fact of a widespread and established usage, at least, a tendency to show that they had such knowledge."

Mr. William Hassall, 63 and 65 Elizabeth street, New York, enjoys the distinction of being the pioneer wire-nail manufacturer in this country. Mr. Hassall started business in 1850 with five wire-nail machines of his own construction. The machines in use abroad were what are known as the German machines, but Mr. Hassall's were distinctly American, and quite different from the older types. In his shop at present some

34 machines in all are in operation, and their product includes American and French wire nails, from $\frac{1}{2}$ inch to any length, with flat, round, oval, depressed, screw and fancy heads, besides cigar box, molding, finishing and various other kind of nails. Mr. Hassall has recently made some improvements in his machines which add largely to their efficiency. The wire-nail industry has already assumed considerable proportions, and its products are being used for various purposes. The larger-sized nails are made of Bessemer steel wire.

Comparative Merits of Anthracite and Bituminous Coals.

The report of the board of officers appointed by the Navy Department "to investigate the comparative merits of anthracite and bituminous coal for ordinary naval uses," &c., has just been issued and contains much valuable information upon the subject indicated. The question is considered as follows:

Heating Power.—In reference to this quality the Navy Department was originally induced to employ anthracite, chiefly in consequence of the report of Prof. Walter R. Johnson, of Washington, in 1844, that the evaporative efficiency of average anthracite was superior to that of bituminous coal, the figures being 9.5648 pounds of water evaporated per pound of coal in the former case, and 8.944 in the latter. They did not fully include the very important circumstances that anthracite fires need to be cleaned in longer service than about 12 hours, and after that time should be more or less thoroughly cleaned once in every 12 hours. This causes loss of evaporative power in the following ways, to which the fires of free-burning coals are subject in a much less degree: (a) By the direct abstraction of heat from the combustible portion of the fuel to bring the earthy matter and ash to the high furnace temperature; (b) by the direct loss of heat when the clinkers and ashes are withdrawn at that high temperature; (c) by the unavoidable loss of some unconsumed coal during the abstraction of the clinkers; (d) by the influx of cold air through the open furnace door during the operation of cleaning fires; (e) by the loss of heat expended in raising the temperature of air over and above the quantity needed for combustion; (f) by the loss of effect during the time that the fire newly cleaned requires to recover full action. The average evaporative power of the semi-bituminous coals is higher than the average evaporative power of the anthracites, being 9.9804 and 9.5648 pounds of water from 212° F., respectively. Their conclusion is strengthened by results of Isherwood's experiments with several marine boilers, some, however, being flue boilers, in which Cumberland semi-bituminous coal generally evaporated more water than Pennsylvania and other anthracites. And these results are further corroborated by experiments of the Baltimore and Ohio Railroad, in which the evaporative effect of 1 ton of Cumberland coal was found to equal that of 1 $\frac{1}{4}$ tons of anthracite. It is asserted that, when combustion is forced, the economic evaporation is relatively less with free-burning coal than with anthracite, but it may be answered that, under circumstances in which the blast or steam-jet is used, economy is temporarily ignored, the object being to produce active combustion, regardless of cost.

Promptness of Ignition.—On this point the report shows that this quality is so valuable in a naval vessel that it almost precludes the employment of anthracite in time of war in favor of a more free-burning coal, and that it has considerable advantages in time of peace.

Weight of a Given Bulk.—The report says that the average of all the semi-bituminous coals of Maryland gives rather the smallest space occupied per ton (42.0372 cubic feet), the anthracite ranking second (42.13 cubic feet), the bituminous coals of Pennsylvania being third, but with very trifling difference (42.671 cubic feet), the coking coals of Virginia being the only free-burning varieties which are decidedly lighter (45.8804 cubic feet), indicating that anthracite is the heaviest class of coal.

Smoke and Soot.—In non-production of smoke anthracite takes the lead; also in freedom from soot.

Action upon Boilers, Grates, &c.—In this respect, the report says, it is likely that there is not much to choose between the anthracites and free-burning coals, at least with iron boilers, for, whereas the intense local heat of an anthracite fire searches and develops any tendency toward blistering or lamination in boiler iron, there are several varieties of free-burning coal which contain sulphur and which are injurious on that account to tube-ends, &c. Both classes will, under certain circumstances, warp and destroy grate-bars.

Impurities.—This subject has been covered in a former division of the report. If spontaneous combustion is feared, the coal should be free from pyrites.

Deterioration.—It is probably true that anthracite will scarcely deteriorate in heating power except after long exposure to the direct action of the sun, as in the coal piled on the sandy beach at St. Paul de Loanda from about 1862 to 1882, for the similar coal at Fernando Po, having been overgrown with weeds and trees, and therefore sheltered from the rays of the sun, was almost as efficient after 20 years as when it was fresh. The free-burning coals, on the other hand, rapidly lose their cohesion and heat-giving power. Anthracite, under favorable circumstances, would last almost indefinitely.

Friction.—The slack of anthracite is worthless on the grates of a boiler, whereas if a free-burning coal, if not too old, it is tolerably efficient in the formation of steam.

Completeness of Combustion.—This is a quality possessed to a greater degree in most of the semi-bituminous coals than in most of the anthracites. Besides the wastefulness caused in the furnace by the greater average formation of clinker with the latter coal, there is the greater labor necessary and time lost in their removal from the boiler and their being disposed of.

Spontaneous Combustion.—In this respect anthracite exceeds all other coals, being entirely free from this source of danger.

Price.—This subject is treated simply from a naval standpoint.

Paris, 1875.

**McCAFFREY & BRO.,**

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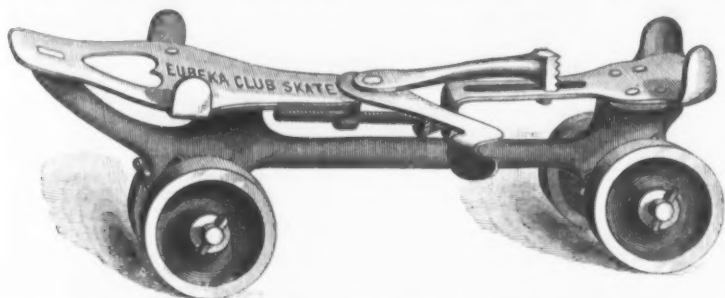
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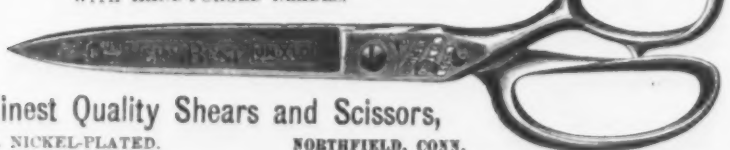
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Hook-Tooth,
Knife,
Knife Blunt,
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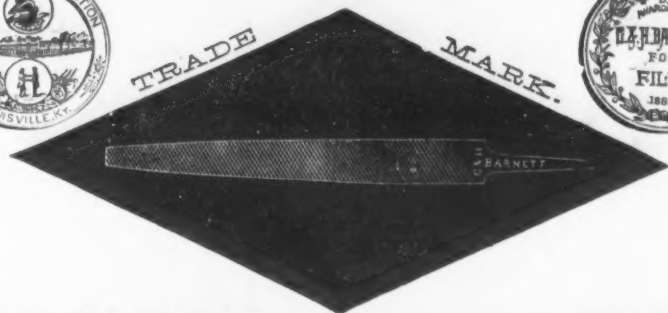
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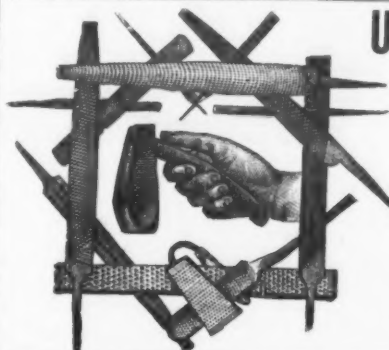
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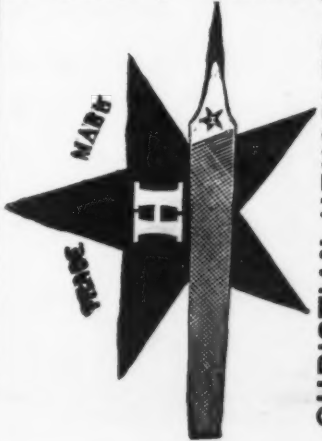
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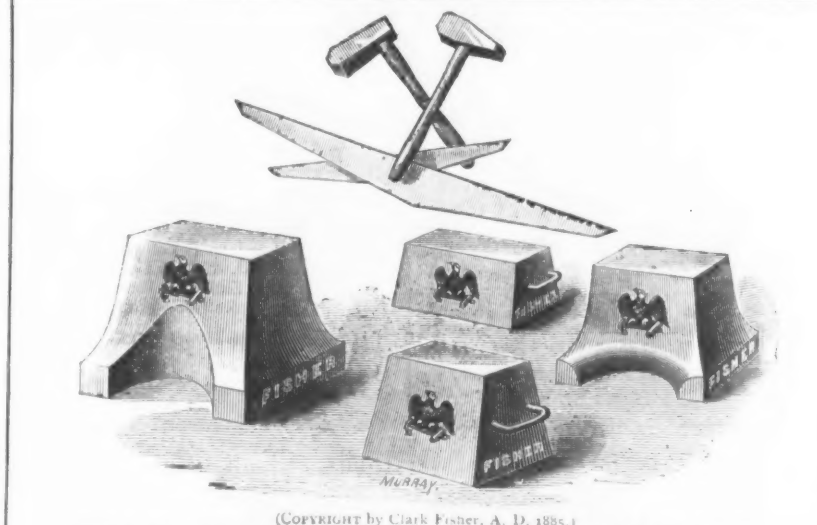
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Manufacturers and the Trade are warned not to infringe on our patent, No. 294,740, either by manufacturing
or selling.

**Consumption of Iron Ore and Fuel in
the Production of Iron and Steel in
1884.**

In collecting the statistics of the pro-
duction of iron and steel in 1884 we asked
the manufacturers to state also how much
iron ore, anthracite coal, bituminous coal,
coke and charcoal they had consumed in the
year. The replies received were very satis-
factory, only a few establishments neglecting
or refusing to send this additional infor-
mation. Fortunately, too, it happened that in
every case of importance the missing statis-
tics could be supplied upon the basis of the
average consumption reported by neigh-
boring works of the same class. It was our
original intention to insert this informa-
tion in our annual report, but it was thought
best to use the totals for that purpose and to
publish the details in the *Bulletin*.

In the following table we give the details
of the consumption of iron ore in the blast
furnaces of the United States, specifying
the localities using imported ore and the
quantity consumed in each, in gross tons:

	Domestic ore.	Foreign ore.	Total Tons.
New England.....	42,160	9,562	51,722
New York.....	127,179	1,918	129,097
Pennsylvania.....	3,329,433	423,498	3,752,931
Maryland.....	62,891	600	63,491
Virginia and North Carolina.....	321,542	321,542	643,084
Georgia.....	89,730	89,730	179,460
Alabama.....	322,304	322,304	644,608
Texas.....	9,543	9,543	19,086
West Virginia.....	72,213	72,213	144,426
Kentucky.....	92,196	92,196	184,392
Tennessee.....	278,290	278,290	556,580
Ohio.....	805,135	1,615	806,750
Indiana and Illinois.....	427,282	427,282	854,564
Missouri.....	80,219	80,219	160,438
Michigan.....	243,810	243,810	487,620
Wisconsin and Minne- sota.....	78,965	78,965	157,930
Colorado.....	24,023	24,023	48,046
Pacific States.....	13,440	13,440	26,880
Total.....	7,213,764	429,188	7,642,952

The total importation of iron ore in 1884
was 487,820 gross tons, so that the above
table leaves 48,637 tons unaccounted for.
It is quite possible that the consumption of
foreign iron ore was that much below the
importation. The following table shows the
consumption of iron ore in the different dis-
tricts of Pennsylvania and Ohio in 1884, in
gross tons:

	Domestic ore.	Foreign ore.	Total Tons.
Lehigh Valley.....	588,250	147,891	736,141
Schuylkill Valley.....	449,085	54,211	503,296
Upper Susquehanna.....	256,212	3,076	259,288
Lower Susquehanna.....	537,914	158,361	696,275
Shenango Valley.....	318,114	318,114	636,228
Allegheny County.....	692,564	20,388	712,952
Miscel. bituminous.....	67,324	40,169	107,493
Charcoal.....	40,790	1,402	42,192
Total Penna.....	3,529,433	425,498	3,954,931

	Domestic ore.	Foreign ore.	Total Tons.
Hanging Rock bit.....	134,963	134,963	269,926
Hanging Rock char.....	61,393	61,393	122,786
Northwestern char.....	1,100	1,100	2,200
Mahoning Valley.....	345,732	345,732	691,464
Hocking Valley.....	46,730	46,730	93,460
Miscel. bituminous.....	306,237	1,615	307,852
Total Ohio.....	805,135	1,615	806,750

The iron ore used in the rolling mills of
the country in 1884 for "fix" in puddling
was, as far as we can ascertain, entirely of
domestic origin, and it may very reasonably
be assumed that no foreign ore was used in
the bloomeries. The quantity of iron ore
consumed in the rolling mills was 354,454
gross tons, and in the bloomeries 120,000
tons. A summary of the consumption of
domestic and foreign iron ore in all the iron
works of the country in 1884 is as follows:

	Gross tons.
Works.....	80,829,947
Blast furnaces.....	354,454
Rolling mills.....	120,000
Bloomeries.....	120,000
Total.....	81,224,401

In the consumption of fuel in blast
furnaces coke takes the leading place, followed
by anthracite coal, and then by charcoal,
raw bituminous coal coming last. In the
following table we give the total consump-
tion of fuel in the blast furnaces located in
New York, New Jersey, Pennsylvania and
Maryland, the only States in which anthra-
cite coal is used. To the coke consumed in
the Shenango Valley should be added 22,488
tons of raw bituminous coal.

	Charcoal, Bushels.	Anthracite, Gross tons.	Coke, Gross tons.
New York.....	2,998,333	257,776	54,043
New Jersey.....	80,879	15,596	15,596
Pennsylvania.....	496,806	66,780	66,780
Lehigh Valley.....	284,744	110,822	110,822
Schuylkill Valley.....	190,852	32,448	32,448
Upper Susquehanna.....	224,399	330,496	330,496
Lower Susquehanna.....	280,475	567,816	567,816
Misc. bitum.....	3,469,793	8,662	7,855
Charcoal.....	1,945,023	8,662	7,855
Maryland.....	1,945,023	8,662	7,855

The total consumption of Pennsylvania
was 1,899,879 tons of coke, 1,187,341 tons of
anthracite coal, 3,409,793 bushels of char-
coal, and 22,488 tons of raw bituminous coal.
The total consumption of fuel in 1884 in the
blast furnaces of the States not included in
the above table was as follows:

	Coke, Gross tons.	Bitum. coal, Gross tons.	Charcoal, Bushels.
New England.....	2,156,400	2,156,400	2,156,400
Virginia and North Carolina.....	2,337,103	2,337,103	2,337,103
Georgia and Alabama.....	8,130,836	8,130,836	8,130,836
Texas.....	799,548	799,548	799,548
West Virginia.....	1,164,730	1,164,730	1,164,730
Kentucky.....	2,571,098	2,571,098	2,571,098
Tennessee.....	3,919,100	3,919,100	3,919,100
Indiana and Illi- nois.....	3,195,712	3,195,712	3,195,712
Missouri.....	15,098,497	15,098,497	15,098,497
Michigan.....	3,454,655	3,454,655	3,454,655
Wisconsin and Minnesota.....	815,568	815,568	815,568
Colorado.....	815,568	815,568	815,568
Pacific States.....	815,568	815,568	815,568

In the rolling mills, steel works and
bloomeries of the country the consumption of
fuel in 1884 was as follows: Raw bituminous
coal, 3,990,000 gross tons; anthracite coal,
429,617 tons; coke, 135,895 tons; charcoal,
11,533,507 bushels. A summary of the total
fuel consumption is as follows:

	Blast fur- naces.	Other works.	Total.
Coke, gross tons.....	135,895	135,895	271,790
Anthracite, gross tons.....	1,543,688	429,617	1,973,305
Bituminous, gross tons.....	3,990,000	4,226,966	8,216,966
Charcoal, bushels.....	50,777,153	11,533,507	62,310,660

Having given above the total consumption
of iron ore and fuel in the iron works of the
country in 1884, we now proceed to show
the average consumption of these raw ma-
terials in the blast furnaces of the various
sections. The following comprehensive

table gives the average consumption per
gross ton of pig iron, of anthracite coal and
coke, bituminous coal and coke, charcoal
and iron ore, omitting Indiana, Minnesota
and the coke furnaces of Wisconsin:

	Anth. and coke, Tons.	Bitum. and coke, Tons.	Char- coal, Bush.	Iron ore, Tons.
New England.....	1.61	1.32	2.1	2.1
New York.....	1.55	1.28	1.9	1.9
New Jersey.....	1.5	1.13	1.4	1.4
Pennsylvania.....	1.57	1.12	1.73	1.73
Maryland.....	1.51	1.32	2.2	2.2
Georgia, Ala. & N. C.....	1.32	1.12	1.73	1.73
Texas.....	1.51	1.12	1.73	1.73
West Virginia.....	1.52	1.12	1.73	1.73
Kentucky.....	1.52	1.12	1.73	1.73
Tennessee.....	1.46	1.12	1.73	1.73
Ohio.....	1.74	1.12	1.73	1.73
Illinois.....	1.3	1.12	1.73	1.73
Missouri.....	1.43	1.12	1.73	1.73
Michigan.....	1.43	1.12	1.73	1.73
Wisconsin.....	1.56	1.12	1.73	1.73
Colorado.....	1.56	1.12	1.73	1.73
Pacific States.....	1.56	1.12	1.73	1.73
Average.....	1.52	1.36	1.93	1.87

The corresponding figures of averages for
the several districts of Pennsylvania and
Ohio are as follows:

	Anth. and coke, Tons.	Bitum. and coke, Tons.	Char- coal, Bush.	Iron ore, Tons.
Lehigh Valley.....	1.46	1.12	1.92	1.92
Schuylkill Valley.....	1.50	1.12	1.92	1.92
Upper Susquehanna.....	1.48	1.12	1.92	1.92
Lower Susquehanna.....	1.45	1.12	1.92	1.92
Shenango Valley.....	1.38	1.12	1.92	1.92
Allegheny Co.....	1.35	1.12	1.92	1.92
Miscel. bitum.....	1.59	1.12	1.92	1.92
Charcoal.....	1.59	1.12	1.92	1.92
Total Penna.....	1.5	1.43	1.64	1.83
Hang. Rock char.....	3.04	1.72	2.76	2.76
Mahoning Valley.....	1.38	1.12	1.92	1.92
Hocking Valley.....	2.49	1.12	1.92	1.92
Miscel. bitum.....	1.68	1.12	1.92	1.92
Total Ohio.....	1.74	1.12	1.76	1.76

These tables of averages are exceedingly
interesting, and a close examination and
comparison of their details will serve to
show under what disadvantages of lean ores
and heavy fuel consumption some sections
are suffering, while other sections enjoy very
rich ores and use a minimum of fuel. In a
table of averages the best practice cannot be
shown, but the exhibit we have made will at
least serve to show which sections are ac-
complishing the best results—whether from
natural advantages or from a careful selec-
tion of materials those familiar with the
American iron trade will be able to deter-
mine.—*Bulletin*.

A Test For Stay-Bolt Iron.

The *Railroad Gazette* reports that Mr. F.
M. Wilder has in use on the New York, Lake
Erie and Western Railroad a simple test for
stay-bolt iron which has proved very satis-
factory, not only because it is so easily and
quickly made, but because it has been found
to give a more certain indication of the qual-
ity of the iron for that particular use than
the ordinary tensile or torsional tests made
with special testing apparatus.

A piece of the iron to be tested, 2½ to 3
feet long, is firmly fixed in a vise, horizon-
tally, and a piece of pipe, fitting it loosely,
slipped over it to within 6 inches of the edge
of the vise, leaving that much of the iron to
be tested bare. Two men then walk around
with the end of the pipe until the iron has
been bent to a right angle, when it is
bent back straight again as nearly as may
be. The piece is then turned half round in
the vise and the operation repeated, and so
on until the specimen breaks, which it gener-
ally does all at once, on one edge or the
other, about an inch or more from the edge
of the vise. No support whatever is afforded
to the exposed section of the iron, but the
strain is left to concentrate itself wherever
it will, and the quality is judged by the
number of complete right-angle bends of this
kind which the specimen will stand, which
is found to vary from 4 to 16 in specimens
of ½-inch iron sold for good stay-bolt iron.
In the same lot, however, great fluctuations
than two or three bends are not common,
and the present requirement is that in addi-
tion to the usual tests stay-bolt iron shall
stand 12 bends on an average without
fracture.

This test had its origin in the fact that the
fractures, coming as they do on the inner
edge of the outside fire-box sheet, indicated
that they arose from a bending strain con-
centrating itself at that point. It was at
first attempted with success to imitate the
effect of these strains by vibrating the upper
end of a stay-bolt in a shaper, giving it a
throw of ½ inch (which was assumed as
about the maximum to which they were ex-
posed in service), the lower end being fixed
in the usual way in a piece of boiler iron. It
was found that from 2000 to 9000 vibrations
of this kind sufficed to produce fractures of
the same kind and in the same place as in
stay-bolts in service. The idea was then
conceived of attempting to shorten the test
by bending them through a larger angle, and
the two methods when compared were found
to agree sufficiently well to make the simpler
test a very fair one.

An interesting feature in the test is the
practical illustration it gives of the effect of
overstrain to "strengthen"—i. e., harden—
the iron. At each successive bending the
force required to bend it increases very notice-
ably, so that the nearer it is to breaking
the harder it is to bend. No better illustra-
tion could be desired of the worthlessness of
tests for ultimate strength alone as an indica-
tion of quality.

It turns out that the upper blast furnace
property in Steubenville, which was sold
recently by the sheriff and bid in by Jasper
M. Porter, of New Cumberland, was in
reality bought for the Riverside Iron Works,
of this city. They will at once begin over-
hauling the works, and expect to get every-
thing in order by July 1 to commence the
manufacture of Bessemer pig to supply their
steel plant at Benwood. It is understood
that this steel plant requires 1500 tons of
pig per week, while the company's blast
furnaces have a capacity of only about 1000
tons per week. When the furnace at
Steubenville is put into operation this defi-
ciency will be fully supplied. The company
will not at present utilize the coal property
they purchased with the furnace.—*Steubenville
News-Letter*.

INFRINGEMENT OF JOHN WILSON'S TRADE MARK, MASSACHUSETTS, U.S.A.

JOHN WILSON'S
BUTCHERS' KNIVES,
BUTCHERS' STEELS,
and
SHOE KNIVES.

TRADE MARK



REGISTERED IN ENGLAND,
WASHINGTON, U.S.A.,
AUSTRALIAN & OTHER
BRITISH COLONIES, &
GERMANY.

ACKNOWLEDGMENT AND AGREEMENT.
"WHEREAS, I, GEORGE A. ROBINSON, of West Mansfield, County of Bristol, State of Massachusetts, have heretofore manufactured and sold certain Knives bearing a Mark which is claimed to be an imitation of the trade-mark owned by John Wilson, of Sheffield, England, which consists of four peppercorns and a diamond, under the mistaken belief that I had the right to do so.
NOW, This, is to Witness, that, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,
FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and
SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1885.

Witness—
F. M. REED,
(Attorney for Defendant.)

G. A. ROBINSON, (L.S.)

Imitation  J. WILSON'S SHEAR STEEL MARK

WORKS: SYCAMORE ST. SHEFFIELD ENGLAND. Established 1750.

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J. R. TORREY RAZOR CO.,
MANUFACTURERS OF
Razors in all Styles.

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American Screw Co.'s Wood, Machine and Rail
Screws, Store and Tire Bolts, Rivets, Ac.

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Successors to BRADFORD & ANTHONY,

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Bellows Manufacturer,

Johnson Street,

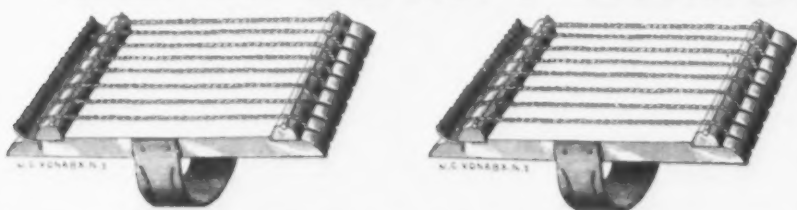
Cor. 22d St.,

CHICAGO, ILL.



JAY-EYE-SEE

NEW IMPROVED PATENT WIRE CURRY COMB.



Lightest and best for general use. Most durable Comb made. Most humane and only Comb fit to use on a horse's legs, shoulders and flanks. It lifts every hair and throws out the dirt. Rubs and cleans the skin, but cannot cut or scratch it. Is without a rival for cleaning a mule or sweaty animal. A wonder on a shedding horse. It cleans itself, and has an improved attachment which cleans a brush with ease and rapidity. Send for Circulars and Prices. Sample by mail, 50 cents.

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Maltby, Curtiss & Co., New York, O. S. Chamberlain,

Sole Agents for the Eastern, Southern and Export Trade.

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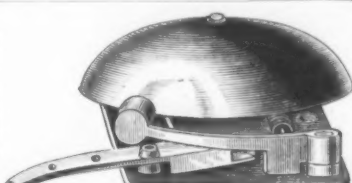
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F. & W. CLATWORTHY, AGENTS.

The demand for JOSEPH RODGERS & SONS' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam-power.
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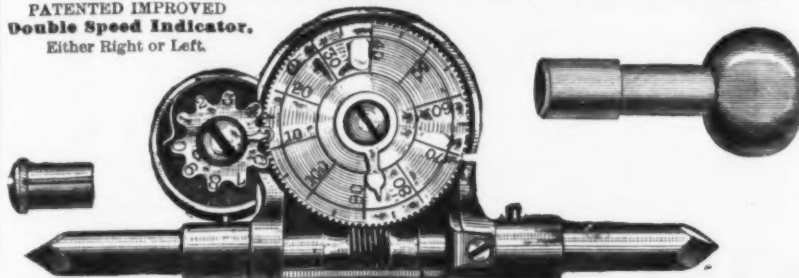
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Either Right or Left.



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NO SOLDER.

THE BEST AND CHEAPEST.

Superseding all Others
Wherever Introduced.

TWO SIZES: { No. 1, holding 3 Pints.
 { No. 2, " 2 "



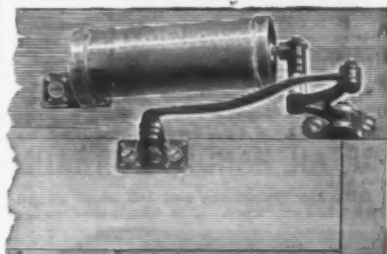
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GREAT REDUCTION IN PRICE.



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Perfect Working
SKATE
Yet Produced.

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December, 23, 1875.

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The back strain when the wrench is used is
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The strongest Wrench made, and the only suc-
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None genuine unless stamped

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THE BEST
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Also Manufacturers of
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CHAMPION DRYER.

For illustration see last Iron
Age. Circulars and discounts
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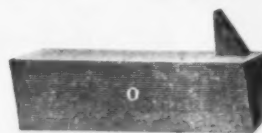
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Tools, Solid Cast Steel Pump Augers and Beams.

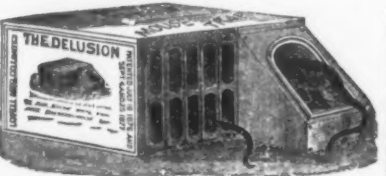
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In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

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THE DELUSION MOUSE TRAP.



The Mouse goes in to get the bait. And shuts the door by his own weight. And then he jumps right through a hole. And thinks he's out; but, bless his soul! He's in a cage, somehow or other, And sets the trap to catch another.

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LOVELL MFG. CO., Limited,
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AGENTS IN ALL FOREIGN COUNTRIES.



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Block and Pump Manufacturer.
Manufacturer of Inside Iron Strap and all kinds Tackle Blocks, Mast Hoops, Hanks, Belaying Pins, Hand Spikes, Hand Pumps, &c. Also Dealer in Lignumvitæ Wood, for Beam Faces and Roller Beds, &c.
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NO OIL REQUIRED.

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Lignum-Vitæ and Iron Sheaves, WITH Plain, Roller and Self-Lubricating Bushings. Heavy Purchase Blocks FOR Contractors, Builders, Railroad and Mining Use.
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BAGNALL & LOUD BLOCK CO., BOSTON, MASS., MANUFACTURERS OF THE

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These goods can be obtained of the general hardware trade and of our AGENTS:
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BRODERICK & BASCOM ROPE CO., St. Louis.
BAUMGARDNER, WOODWARD & CO., Philadelphia, Pa.

The Wages Scale Proposed by the Western Iron Manufacturers.

The following is in full the proposed scale of wages, based upon the iron manufacturers' card of prices, and declining with the same without limit, to govern the wages of the several departments as herein stated, for one year, commencing June 1, 1885, and ending May 31, 1886. The decline in prices below the 2.5-cent card shall be in the same proportion as the changes between 2.5-cent and 3-cent card. It is understood that in mills running on specialties, separate contracts may be made between the manufacturers, rollers and heaters without interfering with this agreement. The price for working mild steel shall be 10 per cent. less than for iron, excepting sheets thinner than No. 20 gauge, which shall be the same price as iron.

[The scale in force has the following sections differing from those proposed: It is further agreed, that no scale shall go below the price paid on the manufacturers' card, selected as a basis. It is also understood that iron mills (except sheet mills) working steel shall pay price and one-half price for steel, but this shall not apply to mild steel—that is, working that steel of which the output of the mill shall be as great as when working iron of the same sizes; but when the output of steel is but three-fourths the output of iron, the rule price and one-half price shall apply.]

BOILING.			
Western Iron Ass'n card.	Boiling per ton, 2240 lbs.	Western Iron Ass'n card.	Boiling per ton, 2240 lbs.
2-5-10.....	\$5.00	3-8-10.....	\$6.00
2-6-10.....	5.10	3-9-10.....	6.75
2-7-10.....	5.20	3-10-10.....	6.80
2-8-10.....	5.30	4-1-10.....	7.07
2-9-10.....	5.40	4-2-10.....	7.25
3.....	5.50	4-3-10.....	7.42
3-1-10.....	5.60	4-4-10.....	7.60
3-2-10.....	5.75	4-5-10.....	7.80
3-3-10.....	5.87	4-6-10.....	8.00
3-4-10.....	6.00	4-7-10.....	8.20
3-5-10.....	6.15	4-8-10.....	8.40
3-6-10.....	6.30	4-9-10.....	8.60
3-7-10.....	6.45	5.....	8.80

\$1 per ton extra for all castings over 100 pounds in one piece, \$1 per ton extra for not (ore) fix.
[The present scale is \$5.50 for 2.5-cent card, all the other rates for boiling being 50 cents higher.]

MUCK OR PUDDLE MILL.
The price to be paid for muck rolling per ton of 2240 pounds shall be 10 per cent., or one-tenth of the straight price paid for boiling, the roller to pay all labor in taking iron from squeezer and delivering upon bank, straightened.

[Scale in force reads: The price to be paid for muck rolling per ton of 2240 pounds shall be 12½ per cent., or one-eighth of the straight price paid for boiling, the roller to pay all labor in taking iron from squeezer and delivering upon bank, straightened, except bloom boy. In such case, where a bloom boy is used, the manufacturers hereby agree to pay one-half the wages paid to said bloom boy. This scale applies to muck trains with two sets of rolls or less. On trains with three or more sets of rolls the extra hands required thereon shall be paid by the company.]

BAR AND NAIL PLATE MILLS.			
Western Iron Ass'n card.	Bar roll'g and heating; 2240 per ton.	Western Iron Ass'n card.	Bar roll'g and heating; 2240 per ton.
2-5-10.....	60¢	3-3-10.....	79¢
2-6-10.....	61½¢	3-4-10.....	75¢
2-7-10.....	63¢	3-5-10.....	77¢
2-8-10.....	64½¢	3-6-10.....	79¢
2-9-10.....	66¢	3-7-10.....	81¢
3.....	67½¢	3-8-10.....	83¢
3-1-10.....	69¢	3-9-10.....	85¢
3-2-10.....	71¢	4.....	87¢

All sizes below 1½ x ¼ inch flats and 1-inch rounds and squares worked on bar mill to be paid guide mill prices. Catching on a bar mill shall be five-tenths of the price paid for rolling on a bar mill. Nail plate, sheet bar and billet rolling, 10 cents per ton less than bar rolling. Heating nail plate to be the same price as bar heating. Heaters on 12-inch mill to receive bar mill price to be paid by the company.

[Present scale, 10 cents higher, and following changes: All sizes below 1½ x ¼ inch flats, 1½-inch rounds and 1-inch squares worked on bar mill to be paid guide-mill prices. Catching on a bar mill shall be five-eighths of the price paid for rolling on a bar mill. Nail plate rolling, 7 cents per ton less than bar rolling.]

GUIDE MILL.			
2-16 rounds and squares.....	\$15.00	3-16 rounds and squares.....	12.00
2-14 rounds and squares.....	12.00	3-14 rounds and squares.....	9.00
2-12 rounds and squares.....	9.00	3-12 rounds and squares.....	7.75
2-10 rounds and squares.....	7.75	3-10 rounds and squares.....	6.50
2-8 rounds and squares.....	6.50	3-8 rounds and squares.....	5.00
2-6 rounds and squares.....	5.00	3-6 rounds and squares.....	4.75
2-4 rounds and squares.....	4.75	3-4 rounds and squares.....	4.50
2-2 rounds and squares.....	4.50	3-2 rounds and squares.....	4.00
2-1 round and square.....	4.00	3-1 round and square.....	3.00
2-16 half rounds.....	15.00	3-16 half rounds.....	12.00
2-14 half rounds.....	12.00	3-14 half rounds.....	9.00
2-12 half rounds.....	9.00	3-12 half rounds.....	7.75
2-10 half rounds.....	7.75	3-10 half rounds.....	6.50
2-8 half rounds.....	6.50	3-8 half rounds.....	5.00
2-6 half rounds.....	5.00	3-6 half rounds.....	4.75
2-4 half rounds.....	4.75	3-4 half rounds.....	4.50
2-2 half rounds.....	4.50	3-2 half rounds.....	4.00
2-1 half round.....	4.00	3-1 half round.....	3.00
2-16 oval.....	15.00	3-16 oval.....	12.00
2-14 oval.....	12.00	3-14 oval.....	9.00
2-12 oval.....	9.00	3-12 oval.....	7.75
2-10 oval.....	7.75	3-10 oval.....	6.50
2-8 oval.....	6.50	3-8 oval.....	5.00
2-6 oval.....	5.00	3-6 oval.....	4.75
2-4 oval.....	4.75	3-4 oval.....	4.50
2-2 oval.....	4.50	3-2 oval.....	4.00
2-1 oval.....	4.00	3-1 oval.....	3.00
2-16 half oval.....	15.00	3-16 half oval.....	12.00
2-14 half oval.....	12.00	3-14 half oval.....	9.00
2-12 half oval.....	9.00	3-12 half oval.....	7.75
2-10 half oval.....	7.75	3-10 half oval.....	6.50
2-8 half oval.....	6.50	3-8 half oval.....	5.00
2-6 half oval.....	5.00	3-6 half oval.....	4.75
2-4 half oval.....	4.75	3-4 half oval.....	4.50
2-2 half oval.....	4.50	3-2 half oval.....	4.00
2-1 half oval.....	4.00	3-1 half oval.....	3.00
2-16 channel iron.....	15.00	3-16 channel iron.....	12.00
2-14 channel iron.....	12.00	3-14 channel iron.....	9.00
2-12 channel iron.....	9.00	3-12 channel iron.....	7.75
2-10 channel iron.....	7.75	3-10 channel iron.....	6.50
2-8 channel iron.....	6.50	3-8 channel iron.....	5.00
2-6 channel iron.....	5.00	3-6 channel iron.....	4.75
2-4 channel iron.....	4.75	3-4 channel iron.....	4.50
2-2 channel iron.....	4.50	3-2 channel iron.....	4.00
2-1 channel iron.....	4.00	3-1 channel iron.....	3.00
2-16 sheet iron.....	15.00	3-16 sheet iron.....	12.00
2-14 sheet iron.....	12.00	3-14 sheet iron.....	9.00
2-12 sheet iron.....	9.00	3-12 sheet iron.....	7.75
2-10 sheet iron.....	7.75	3-10 sheet iron.....	6.50
2-8 sheet iron.....	6.50	3-8 sheet iron.....	5.00
2-6 sheet iron.....	5.00	3-6 sheet iron.....	4.75
2-4 sheet iron.....	4.75	3-4 sheet iron.....	4.50
2-2 sheet iron.....	4.50	3-2 sheet iron.....	4.00
2-1 sheet iron.....	4.00	3-1 sheet iron.....	3.00

It is agreed that base price at 4.5 cents card rate shall be the straight \$4 rate for guide rolling, with two (2) per cent. additional for each one-tenth (1/10) advance of said card, and two (2) per cent. decline for each reduction of one-tenth (1/10) from said card.

[No change in scale.]

TEN INCH MILL.	
1½ and 9-16 rounds and squares.....	\$4.50
1½ and upward, rounds and squares.....	4.00
¾ ovals.....	5.00
¾ ovals and upward.....	4.00
¾ x ¾ to 3-16.....	5.00
¾ x ¾ to 3-16.....	4.50
1 inch and upward.....	4.00
1½ and upward hoop by 1½.....	4.75
Bands rolled specially for bundling.....	9.00
Billets.....	4.00

HOOP AND COTTON-TIE MILLS.	
1½ and wider by 1½ to No. 15.....	\$4.50
1½ and wider by No. 16 and lighter.....	4.75
1½ and 1½ by 1½ to No. 15.....	4.75
1½ x 1½ x No. 16 and lighter.....	5.00
1½ and 1½ x 1½ to No. 15.....	5.50
1½ and 1½ x No. 16 and lighter.....	6.00
1 x 1½ to No. 15.....	7.00
1 x No. 16 and lighter.....	8.00
¾ x 1½ to No. 15.....	8.50
¾ x No. 16 and lighter.....	9.00
¾ x 1½ to No. 15.....	10.00
¾ x No. 16 and lighter.....	12.00
¾ x 1½ to No. 15.....	13.50
¾ x No. 16 and lighter.....	15.00
1½ x 1½ to No. 15.....	17.50
1½ x No. 16 and lighter.....	20.00
9-16 x hoop lighter than No. 20.....	17.00
Cotton ties.....	5.00
Clips.....	5.00
Slats.....	6.00
Finger.....	5.00

The prices paid for making odd sizes not enumerated in the scale shall be the mean between the next higher and lower prices. Heaters receive one-fourth, and roughers, between them, one-fourth. Nothing extra for piles or crops. Any smaller sizes not enumerated in the 10-inch scale are paid the same as guide-mill prices. No iron to be paid for twice.

[Present scale where differing from proposed scale:]

1½ and upward by 1½.....	\$4.75
1½ and 1½ x 1½.....	5.00
1½ and 1½ x 1½.....	6.00
1 x 1½.....	8.00
¾ x 1½.....	9.00
¾ x 1½.....	12.00
¾ x 1½.....	15.00
9-16 hoop lighter than 20 gauge.....	17.00
¾.....	20.00

All half ovals below regular gauge (one-fourth the thickness of its width) to be classed as hoop prices. All nut iron below ¾ x 1½, \$10 per ton, excepting when rolled on three-half grooved rolls. All angle iron 1½ inch and under, to be price and one-half price. Fifty cents per ton extra for piles and crops, with no percentage off, 2240 pounds per ton. Fifty cents per ton extra for cut hoops, all sizes. The price for rolling cotton tie shall be straight four dollars (\$4) per ton, when bar iron card rates are 3 cents per pound with no percentage off.]

PLATE AND TANK MILLS.			
Western Iron Ass'n card.	Rolling com. iron, p'r ton, 2240 lbs.	Western Iron Ass'n card.	Rolling com. iron, p'r ton, 2240 lbs.
2-5-10.....	\$0.80	3-6-10.....	\$1.05
2-6-10.....	.82	3-7-10.....	1.08
2-7-10.....	.84	3-8-10.....	1.11
2-8-10.....	.86	3-9-10.....	1.14
2-9-10.....	.88	4-1-10.....	1.17
3.....	.90	4-2-10.....	1.20
3-1-10.....	.92½	4-3-10.....	1.23
3-2-10.....	.95	4-4-10.....	1.26
3-3-10.....	.97½	4-5-10.....	1.29
3-4-10.....	1.00	4-6-10.....	1.32
3-5-10.....	1.02½		

[No change in scale.]

Extras.
For Nos. 12, 13 and 14 gauges, 20 cents per ton above common prices. All rolled iron shall be double common prices. Tops and bottoms to be 10 cents per ton less than common prices. Heating same price as rolling. Roller to pay rougher. Roll hands to advance and decline in same proportion as above prices. Six heats to be considered a turn's work.

[Extras now in force: For Nos. 10 and 11 gauges, 20 cents per ton above common prices. For Nos. 12 and 13 gauges, 30 cents per ton above common prices. For Nos. 14 and 15 gauges, 40 cents per ton above common prices. For Nos. 16 and 17 gauges, 50 cents per ton above common prices. 12½ per cent. added for all strong iron.]

SHEET MILL.	
It is agreed that at a three and a half (3½) cents Western Iron Association's card the prices for rolling on a sheet and jobbing mill shall be as follows, with two (2) per cent. additional for each one-tenth (1/10) advance of said card, and two (2) per cent. decline for each reduction of one-tenth (1/10) from said card:	
Gauges.	Price for rolling on a 3½ card per ton, 2240 pounds.
No. 8 and heavier.....	\$4.50
No. 9 to 11.....	5.00
No. 12 to 14.....	6.00
No. 15 to 17.....	7.00
No. 18 to 21.....	8.50
No. 22 to 24.....	10.00
No. 25 and 26.....	11.00
No. 27.....	12.00
No. 28.....	13.00
No. 29.....	14.00
No. 30.....	15.00

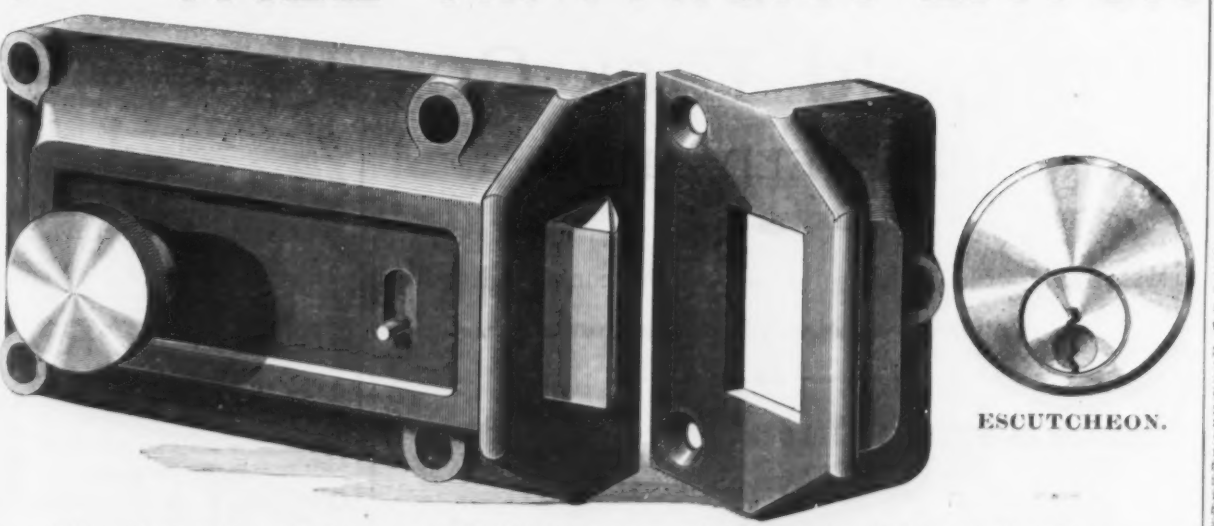
[No change in scale.]

[Present Scale: The Birmingham, England, wire gauge to be the ruling standard weight. Heater to receive one-fourth above prices, one-fifth to be deducted by the firm for the purpose of being enabled to make a special arrangement with the shearmen; roller to receive balance and pay rougher and catcher only. Sheet mills, either single or double, shall not be restricted in the number of heats or pairs for a day's or a turn's work. The following is the existing scale, the Birmingham, England, wire gauge to be the ruling standard weight:]

WEIGHTS OF BIRMINGHAM WIRE GAUGE.			
No. 16.....	2.5	No. 24.....	1
No. 17.....	2.125	No. 25.....	.9
No. 18.....	1.875	No. 26.....	.8
No. 19.....	1.71875	No. 27.....	.72
No. 20.....	1.5625	No. 28.....	.64
No. 21.....	1.40625	No. 29.....	.56
No. 22.....	1.25	No. 30.....	.5
No. 23.....	1.12		

And when sheets are lighter than the gauge they represent the next higher or lighter gauge to be taken for the rolling price. For steel sheets harder than iron rolled on iron sheet mills the price shall be twenty (20) per cent. above common iron prices. Ten per cent. added on all strong iron, by whatever name called. No. 22 and lighter. All sheets, No. 18 and lighter, over 32 inches wide, 10 per cent. extra on above prices. Heater to receive one-fourth above prices and 3 cents per bundle extra, to be paid by the company, for all iron, No. 20 and lighter, annealed in an open

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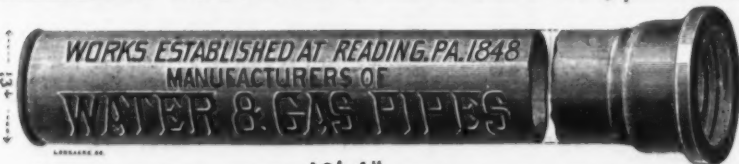
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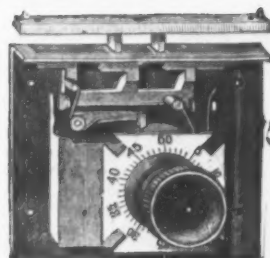
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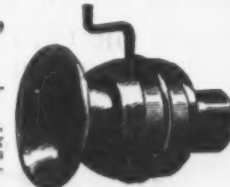


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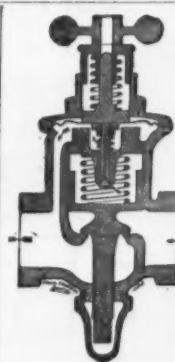
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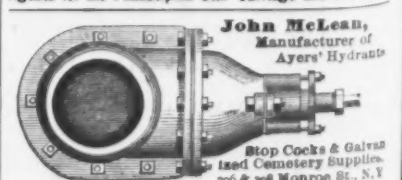
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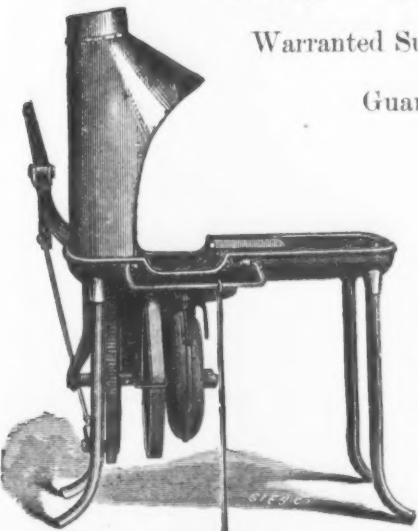
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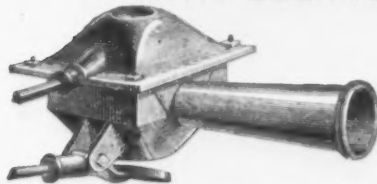
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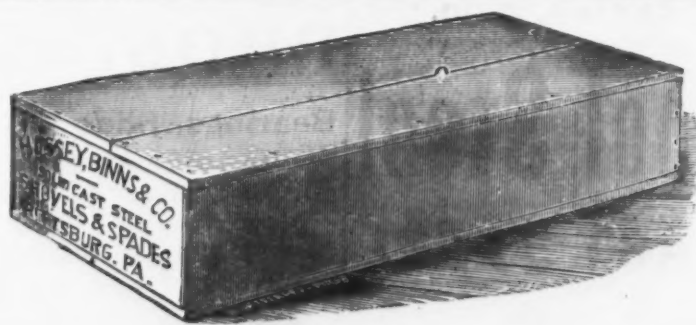
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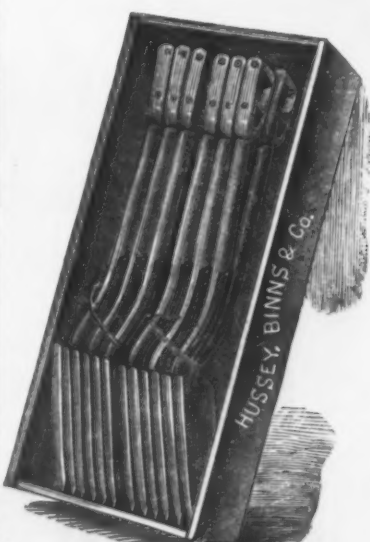
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5 1-10 bar iron.....	87 1/2	87 1/2
5 3-10 bar iron.....	87 1/2	87 1/2
5 4-10 bar iron.....	87 1/2	87 1/2
5 5-10 bar iron.....	87 1/2	87 1/2
5 6-10 bar iron.....	87 1/2	87 1/2
5 7-10 bar iron.....	87 1/2	87 1/2
5 8-10 bar iron.....	87 1/2	87 1/2
5 9-10 bar iron.....	87 1/2	87 1/2
6 bar iron.....	87 1/2	87 1/2

[No change in scale.]

Seven (7) per cent. to be deducted from finished iron for clippings.

English Letter.

(From Our Regular Correspondent.)

LONDON, May 4, 1885.

THE SITUATION

is still characterized by a great deal of uncertainty, and we are shuttled about by the news from day to day as to war with Russia or the preservation of peace. One morning everything seems to indicate war, and the next everybody is pacific, and peace, or at the worst a friendly arbitration, appears certain. At the moment the peace idea is in the ascendant, and we are assured that the Czar will not permit matters to proceed to open hostilities. The stocks of all sorts have gone up to-day, and we are all experiencing the sort of relief which a man feels who has narrowly escaped being forced into a deadly quarrel against his will. At the same time, we have no official assurance that this view is the right one; consequently, business transactions of all kinds are of the barest possible kind, and must remain so while these great political issues are undecided. Pretty much the same state of affairs prevails throughout Europe, inasmuch there is a vague impression that a war between England and Russia could not be confined to those two powers, but must sooner or later involve Austria, Turkey, Italy, Greece and possibly France and Germany. The prevailing uncertainty, therefore, is afflicting all Europe with paralysis, and there is a deadlock in almost every direction. Our own Government continues to engage first-class shipping for transport and other military or naval purposes, and has secured many of the finest vessels of the Atlantic, Mediterranean, Indian and Australasian mail services. They may not be wanted at all, but they are "booked" all the same, and most of them are being rapidly transformed from luxurious ocean palaces into fast, if not truly formidable, transports and armed cruisers. As one result of this line of action freights are mounting upward very rapidly to the Eastern, Black Sea, Baltic, &c., ports, and would undoubtedly go to much higher levels were there more cargoes on offer. Naturally enough shippers are keeping back all the goods they can hold safely, and are thus enabled to check the capacity of the ship-owners, many of whom need but little excuse to advance freight rates.

The manufacturing activity resulting from the Government orders for machinery, ammunition, sidearms, tanks, water-pipes, saddles, harness, bridles, stirrups, buckets and general camp or field fittings is unabated, and serves to impart activity to many branches of the iron and hardware industries which otherwise would be very poorly engaged. The prices paid in some instances are reported not to be at all good, but I have a general impression that, as a rule, Government departments obtain pretty much the value they pay for—certainly not more.

THE INSTITUTE MEETING

which will take place a few days hence is not likely to be very lively or to be characterized by a more than average attendance. I have to-day posted you the seven papers proposed to be read. There were 11 papers on the list originally, but four of these are deleted, including that promised by Sir Henry Bessemer on the manufacture of steel. I am correct, I believe, in stating that Sir Henry Bessemer fully intended to read such a paper, but he has been prevented from preparing it, owing to a pressure of private affairs. It is a pity that such is the case, as Sir Henry would probably have hit hard, and would have avenged himself for the remarks of Mr. Seebohm at the Chester meeting last autumn. Of the papers actually to be read one of the most interesting is that by Mr. Andrew Carnegie, of New York and the Edgar Thomson Steel Works, on the use of natural gas in the manufacture of iron and steel. Mr. Carnegie appears to regard this application as a success, but we poor Britons cannot appreciate the thing properly, because we have not any natural gas in Great Britain. Mr. Lowthian Bell's paper is of some interest to coke users, those of Dr. Sorby and Dr. Weddell are useful contributions to metallurgical microscopy, while that of Mr. Nordenfelt describes a new adaptation of iron founding which is said to yield castings with elongation, tensile strength, &c., equal to forged iron.

THE INVENTIONS EXHIBITION,

or "The Inventories," as it is familiarly styled, has been opened to-day with a good deal of pomp and circumstance. It occupies the same site, at South Kensington, London, as the Healthier last year, but is larger, and, so far as I could judge from a casual run round it, seems likely to be another big success. Last year the Healthier had nearly 4,000,000 visitors, and there is every reason for believing that the Inventories will beat that record. The American section seems pretty forward, the splendid collection of machinery sent by the Waltham Watch Company being in full operation. I fancy this company will "take the cake" for its stand. The electric lighting of the exhibition will be very complete, some 7000 or 8000 arc and glow lamps being used every night.

THE IRON MARKET

is still quiet and irregular as to values, owing to a great extent to the uncertainty which characterizes the political outlook. At Glasgow the market has been quiet as to values, but a fair amount of business is reported to have been done in warrants, which closed at 41 1/2 p. ton. The improved condition of the steel trade in Scotland has not yet benefited the iron market, chiefly owing

to the relatively small shipments and the steady growth of the reserve stocks. Makers' brands are generally about 6d p. ton cheaper on the week. At Middlesboro' pig iron is weak at about 33 1/2 @ 34 1/2 p. ton for No. 3. Shipments are on a rather better scale, and the local consumption is said to have undergone an augmentation, but the outlook does not appear to inspire much confidence, and certainly does not tend to strengthen values. On the West Coast hematite pigs are scarcely so firm, mixed lots in usual proportions being about 43 for prompts and 44 for futures. The consumption is on a good scale, but the make is more than equal to it, and the surplus stocks keep down prices. In all the other smelting districts pig iron is not very strong, and the production over and above that used up in filling running contracts is disposed of in a manner and at quotations which are largely in favor of buyers. In heavy manufactured iron and ironwork there is a fairly good turnover on Government, structural, dockyard and railway account. Here and there pressure exists to get the work out to time, but, as a rule, makers are pretty well able to cope with their orders. Fencing wire is still dull at late rates, and galvanized sheets are only in moderate request at varied and varying figures. In the latter branch competition is very close, and the recently-attempted reorganization appears to have come to nothing. Ordinary finished iron is quoted as of late, but all prices are quite nominal, and are subject to special negotiations in almost every transaction. The demand is not brisk, and, such as it is, runs mainly on common and medium sorts of bars, sheets, plates, angles and hoops. Old materials are quiet at £2. 12/6 for old D. H. iron rails, £2. 2/6 for No. 1 heavy wrought scrap, £2. 2/6 for old boiler tubes, £2. 6s @ £2. 2/6 for old cast iron, and £2. 5/ @ £2. 7/6 for old leaf-spring steel, f.o.b. London or other good British port.

Freights are quiet as regards the Atlantic routes, but firmer and irregular with war risks to Eastern, Baltic and Black Sea ports. Pig iron by ordinary steamers, Glasgow to New York, is 1/ p. ton, and from about Liverpool the same. Tin plates from Liverpool to New York are 3/6 @ 4/6, and from Bristol Channel ports 7/ @ 7 1/2 p. ton. Sailing freights from the Clyde, for pig iron, include: Dunedin, 25/; Monte Video, 25/; Montreal, 10/; New York, 5/; Philadelphia, 5/; Portland, 10/; Providence, 12/6; Rangoon, 22/6; Rio Janeiro, 22/6, and San Francisco, 22/6.

Steel is quiet as regards the Sheffield older branches, but is active in respect of mild steel for shipbuilding purposes and some kinds of Bessemer material. In Scotland the works are so well engaged that they have again advanced ship plates 2/6 p. ton and angles 5/ p. ton, and are firm at the rise. Steel rails are steady, but nominally unaltered, on the £4. 15/ basis. Some of the mills are well engaged, while others are clearing their order books rather rapidly. Several inquiries for further supplies for India, &c., are in the market.

SCOTCH PIG IRON

is very quiet, but has remained fairly steady as regards the price of warrants, although some of the special brands are about 6d p. ton easier on the week. The steel trade of Scotland is very active, but iron has not benefited thereby up to the present. There are 90 furnaces at work in Scotland (11 hematite, 1 silicious and 78 ordinary), as against 97 a year ago. In Connal's stores there are 594,997 tons (an addition of 296 tons last week), compared with 592,664 this date 1884. Shipments to date are 31,998 tons in arrears, while the importations of Middlesboro' pig iron into Scotland are 41,793 tons ahead to date this year. Current prices:

Deliverable alongside.	No. 1.	No. 3.
Gartsherrie, at Glasgow.....	50/6	46/
Coltness, ".....	52/6	49/6
Langloan, ".....	52/6	49/6
Summerlee, ".....	50/6	46/
Caldar, ".....	51/6	46/
Carnbroe, ".....	48/	45/6
Clyde, ".....	46/9	42/9
Monkland, ".....	42/	40/
Quarter, ".....	41/9	39/6
Govan, at Broomfield, ".....	42/	40/6
Shotts, at Leith, ".....	50/6	50/
Carroll, at Grangemouth, ".....	52/6	47/
Kinnell, at Bo'ness, ".....	44/	43/
Glengarnock, at Ardrossan, ".....	47/6	42/
Eglinton, ".....	42/	39/6
Dalmellington, ".....	46/	42/6

MIDDLESBORO' PIG IRON

is a trifle weaker, if anything, but it is confessedly difficult to test a market which virtually seems to have no bottom. As will be seen by the appended quotations, No. 3 is about 6d. lower. G. M. B., f.o.b. at makers' wharves in the Tees, less 2 1/2 %:

No. 1 Foundry.....	36/6	Mottled	32/9
" 2 ".....	35/	White	32/3
" 3 ".....	33/6	Refined Metal.....	50/
" 4 ".....	33/3	Kentledge.....	35/6
" 4 Forge.....	33/	Cinder.....	30/6

WEST COAST HEMATITES

are not quite so stiff, despite the circumstance that the steel trade as a whole is pretty well employed and in several branches is in a state of decided activity. The current rates are:

	No. 1.	No. 2.	No. 3.
Cleator.....	45/	44/6	41/
Lonsdale.....	44/6	44/	43/6
Workington.....	44/	43/6	43/
Lowther.....	44/	43/6	43/
Distington.....	44/	43/6	43/
Harrington.....	44/6	44/	43/6
Skelway.....	44/	43/6	43/
Maryport.....	44/	43/6	43/

TIN PLATES.

In London this market has undergone no change of importance since my last. Some of the makers are said to be very full up with orders, but, on the other hand, it is pretty certain that a number of works are in want of business. The Americans are not buying very freely at the moment, and generally orders are not very plentiful. I quote 10 cokes, 13/3 @ 13/9, f.o.b. Liverpool. At Liverpool for the present the trade has got out of the "low" rut, at any rate, as regards both tin and terne plates. Unfortunately, however, the trade is in the "low" rut as regards prices; in fact, the increase in business has been in consequence of makers accepting the low prices that were bound to come in consequence of the enormous overproduction of tin plates that has been going on and will continue to go on until the end of the chapter. Suggestions of 13/ @ 13/2 1/2 for common coke tins have been

made for some time, and since then offers of these figures were made by buyers, and, after being spurned, were ultimately taken. This has been the means of doing away with the quietness and inactivity that has prevailed lately, and considerable business has been transacted during the course of the week. The inquiries for coke tins have been of a varied character, and for many special sizes the prices paid have been chiefly as indicated above, with 13/6 @ 13/9, and even 14 IC for special lots in certain brands, but the latter are not numerous. In addition to coke tin plates there has been more business than usual doing, both in Bessemer and Siemens qualities of steel plates in coke grades. For the former there has been quite a brisk inquiry, and some buying of special sizes in which these generally run. Even these are now generally 13/6 IC, with some brands at 1 1/2 d. @ 3d. more. With all these low prices, however, many orders have been freely booked. For Siemens "steels" there are also very many good inquiries, and there are well-assorted specifications, though the prices are cut down to 14/10, the lowest point possible. These seem to be fast following coke, the difference between Bessemer and Siemens, which used to be about 1/2, being now only a mere trifle. There have been a few more inquiries for charcoal tins and stamping plates, but the orders are not large ones and they are booked simply to keep things going, sellers almost despairing of effecting any improvement in prices. These continue as low as 15/ @ 16/10, and up to 17/6 IC for best qualities. As to ternes reports are again more encouraging, and there is a brisk demand just now, a number of orders pressing for acceptance at certain limits for shipment during the next couple of months. But this eagerness to buy ternes simply arises because prices are down to a very low point. So far, however, the low limits of 13/ @ 13/6 IC have been refused, makers being rather firm.

THE WEEK.

Secretary Endicott last week visited the Rock Island arsenal, which, including ten shops and other buildings, represents an outlay of \$10,000,000.

The contract for supplying 1-cent postal cards for four years was awarded by the Postmaster-General to Calvin C. Woodworth, New York, whose bid was 47.71 cents per 1000.

Commercial houses in this city have received information that American products exported to Cuba and Porto Rico must come in either under the American or the Spanish flag in order to be dutiable under the third column of the Spanish tariff classification. Commodities not thus included must pay the "fourth column" duties, which were long considered a grievous burden on American trade.

The new iron and steel yacht Sybil, building at Harlan & Hollingsworth's yard, at Wilmington, Del., for James Gordon Bennett and Vice-Commodore Douglass, will be launched the latter part of next week. Philip B. Low, of South street, this city, will furnish her with a full suit of crucible cast-steel wire rigging.

A Panama letter says there is not much work being done along the line of the canal, but the American Contracting and Dredging Company have been making good headway, and within a few months the first 9 or 10 miles of the canal will be opened to light-draft vessels. This run will extend from Colon proper to above Gatun.

Well-informed persons in Cuba calculate that the sugar crop this season will be between 550,000 and 600,000 tons.

Lumber exports at Montreal for South America are falling off very materially in consequence of heavy freight charges by the steam lines, which have driven sailing vessels out of the trade.

M. K. Jessup has presented a valuable collection of American woods to the American Museum of Natural History. The specimens are arranged in the sequence of their botanical relationship, and are cut in such a manner as to display the bark, and cross and longitudinal sections of the wood, both polished and in its natural condition. They are supplemented in the case of trees of commercial importance by carefully selected planks or turfs, which often show better than logs the true industrial value of the wood.

Forest fires are destroying large tracts of valuable timber in the lumber regions of Michigan.

Mills using steam-power in Dakota are burning hay, on account of the difficulty in procuring coal.

The dials of the new clock in the Chicago Board of Trade Building are 10 feet and 10 inches in diameter and the pendulum weighs 750 pounds.

The total expenses for the present Croton water supply of the city from 1842 up to January 1, 1884, were \$43,793,663.47, and the revenue from the same \$44,051,697.50. It is proposed to reduce the charge to consumers for the supply of water.

Bankruptcy legislation during the recent session at Albany entirely failed.

It is claimed that good iron ore has been found at Claiborne Point, La.

A large outlay will shortly be made on the canals and harbors of France. A lump sum of 70,000,000 francs is to be expended, of which 713,000,000 francs are for canals,

100,000,000 francs for ports and harbors, and 66,000,000 francs for rivers. In addition there has been a supplementary grant of 100,000,000 francs for the ports and 30,000,000 francs for the canals. Havre and Bordeaux are to have large amounts spent on harbor works.

The annual product of 82 glue factories in the United States is valued at above \$5,000,000.

A number of cordage manufacturers from Europe and the United States have been in this city, on the invitation of John Good, for the purpose of examining some improved machinery for the manufacture of rope.

The custom-house authorities at Montreal last week seized a lot of machinery valued at \$10,000, which was imported from New York duty free, ostensibly as the effects of a newly-arrived immigrant. It was found on the premises of the Canada Bank, lately incorporated by Parliament, and comprises a press and lathe for printing bills. The whole will probably be confiscated.

Lieutenant Howard, who distinguished himself in fighting Riel in the Northwest, is a protégé of Dr. Gatling, of Hartford, and was appointed to handle creditably the machine gun, having had some experience in the Connecticut National Guard.

A Paris correspondent who contrasts the naval strength of England and Russia, and expresses a belief that in case of war the latter would eventually be beaten, has a poor opinion of Russia's naval power. The writer says: "The Russian navy is not up to the mark; the Russian dockyards of the Euxine and the Baltic are full of vessels which, when constructed, will be equal to any that are afloat anywhere. But they are not yet constructed, and those which Russia now has at her disposal will not bear comparison with the latest models afloat under other flags. She has 83 ironclads in her Baltic fleet, but, as a rule, they belong to the early ironclad age."

The hydrographic office of the Navy Department has secured by means of observations made by United States naval vessels data respecting the dimensions and speed of deep-sea waves. The longest recorded wave measured a half-mile from crest to crest with a period of 23 seconds. Waves having a length of 500 or 600 feet and periods of 10 to 11 seconds are the ordinary storm waves of the North Atlantic. As to the height of waves, the most trustworthy measurements show from 44 to 48 feet to be a remarkable height. Waves having a greater height than 30 feet are not commonly encountered.

Dr. Van Tuyl, formerly of this city, who came from Rio de Janeiro last year as representative of the Brazilian Coffee Exhibition in Boston, and who had important mining interests in South America, has been killed by one of his employees, a German engineer.

Under the Post-Office Appropriation bill \$400,000 are available, at the discretion of the Secretary of the Treasury, as remuneration for transporting the foreign mails on American steamships.

The Vessel Owners' and Captains' National Association was formed at Boston on the 13th inst. with the following officers: President, Charles Lawrence, of Philadelphia; vice-presidents, Guy C. Gross, of Bath, and Charles P. Lovell, of Boston; secretary, William F. Humphrey, of Boston, and treasurer, James Van Brunt, of New York.

The official statement of immigration into the United States shows that in April the total arrivals were 50,943, as compared with 66,800 for April, 1884, and that for 10 months ended April 30th ult. the aggregate is 275,468, as against 371,625 for the corresponding period ending April 30th, 1884. Of those who arrived last month more than 18,000 are from Germany, while the arrivals from the United Kingdom were 13,827.

The works of the St. Louis Gas Company have been purchased for \$4,000,000 by a company of Philadelphians. The price per share is said to have been \$315, the face value of the stock being \$50 per share.

Andrew Carnegie's gift of \$50,000 to the Bellevue Hospital Medical College for the purpose of building and equipping a laboratory has borne fruit in a handsome structure of red brick, 50 x 100 feet, and five stories high. It is in East Twenty-sixth street, near First avenue.

The secretary of the Greenwich Fire Insurance Company, of this city, is advised by the State Insurance Superintendent that their directors had violated the law by declaring 12 1/2 per cent. dividends since December 31, 1884. The State Insurance laws provide that no dividends in excess of 10 per cent. per annum shall be declared by any insurance company, unless the company have a net surplus above the total amount of premiums received during the current year. The directors will doubtless call in the excessive 2 1/2 per cent. paid out to stockholders.

Mr. Jacob H. Sommer, of 13 and 15 Lighthouse street, this city, calls our attention to the following points in regard to the industrial exhibition to be held at Paris from July to November, 1885, at the Palace of Industry. The principal details regarding the expense to exhibitors are that the exhibition dues are fixed at \$10 per superficial meter (39 1/2 inches) or per meter in frontage. The upper gallery is rented at \$15 per meter,

the exhibitor being entitled to 1 meter 40 centimeters in depth and the wall surface behind. Cost of representation is \$60. A special representative has been appointed for American exhibitors. The accredited agent will take care of their interests for the reception, installation and daily sale of any goods desired to be sold, which in every case enter the exhibition free of all custom house duties. He will lay the goods before the jury and point out their merits. Payment is made in advance, when making the written application for exhibit and stating the details of space required.

Consul Farnham, of Bombay, reports that the people of India do not take kindly to improved agricultural machinery. American manufacturers who have tried the market on several occasions had such poor success that their consignments were afterward shipped to Australia. Reference is here made to plows, reapers and seed planters. Nevertheless, sales of machinery are made in India in a small way. Thus the international exhibition to be held in Bombay next year will afford an opportunity which Americans should improve.

Don Rafael Zaldivar, President of the Republic of Salvador, while in this city, was served with a summons in a suit brought against him by the Iron-clad Mfg. Co. to recover about \$600, claimed to be due for merchandise. His counsel, ex-Judge Joachimensen, put in a defense that he never received the goods for which the suit was brought. Zaldivar is now a political refugee and is supposed to be returning to New York.

The Brooklyn Bridge expenditures for April were \$36,000, including \$3000 for machinery, which is nearly \$10,000 in excess of the receipts.

The colossal bronze statue of Commodore O. H. Perry will be unveiled in Newport, R. I., September 10.

Ferdinand F. Dufais, for many years a member of the Cotton Exchange, in this city, and formerly a resident of Paris, has been appointed United States consul to Havre.

The Central Pacific Railway will hereafter burn petroleum instead of coal in its Sacramento and other large shops.

An explosion which occurred in the Merchant's Print Works, in this city, 14th inst., was caused, it is alleged, by meddling with the safety-valves. An official inspection of the boilers was made May 1.

Lieut. Eugene Griffin, of the Engineer Corps of the United States Army, read an essay on "Our Seacoast Defenses" before the Military Service Institute last Thursday. He said that the latest practical results in making big guns were that the weight of the gun is increased, the caliber is diminished, the initial velocity of the projectile is increased, and the muzzle velocity is nearly doubled. These improvements have been made in the last 12 years.

The Standard Cement Company, of St. Louis, it is stated, have just been awarded a contract by the City of New York for 2,500,000 barrels of cement, sufficient to employ the works four years.

The Executive Council of the American Exhibition to be held in London in 1886, have, after examining the merits of the various sites for the exhibition, given preference to that at Earl's Court, Kensington, comprising about 22 acres. The American Exhibition will have its own railway station, in its own grounds, and be in direct communication with all the railway systems of the United Kingdom. Visitors will be enabled by the arrangements to see both the British Colonial and the American exhibitions without going from under cover.

The Bureau of Equipment and Recruiting of the Navy have in contemplation the establishment of training schools for enlisted men of the navy at the Washington Navy Yard, to familiarize them with the use of the electrical machinery now being used on vessels, and of the machinery of high-power guns. It is expected that the school will be open about July 1 of this year.

Considerable reduction is making in the appraiser's force in the New York Custom House. The chief cause assigned is the slackness in the import trade. Those discharged thus far were men employed in the damage allowance bureau and sugar division. It is known that Collector Robertson and other custom-house officials are opposed to all damage allowances, and have recommended to Secretary Manning the abolition of the entire system, on the ground that all questions of damage to cargoes should be left for settlement between the importers and the underwriters. A special committee of the Chamber of Commerce have also expressed themselves as opposed to damage allowances.

A report of the Statistical Bureau for Germans Abroad estimates the number of persons born in Germany now resident in America at 1,966,742.

The largest auction sale of cotton goods that ever took place in this city was announced for Thursday last for account of Bliss, Fabyan & Co., and was pronounced a grand success. Over 22,000 cases were disposed of. Mr. Bliss, when the sale was over, said: "We have sold about \$1,600,000 worth of cotton goods to-day. The staples held their own well, and only in the cases of un-

desirable special lots was there any marked falling off. The average falling away from the full market price at private sale was about 3 1/2 per cent., ranging from a minimum of 2 1/2 up to 5 per cent." According to other authorities the low range of prices that has prevailed for six months past was closely approximated by the returns realized.

President Cleveland has appointed a board to examine and report, in accordance with a recent act of Congress, "at what ports fortifications or other defenses are most urgently required, the character and kind of defenses best adapted for each, with reference to armament," and "the utilization of torpedoes, mines or other defensive appliances."

Instead of having lights streaming from the diadem of the Bartholdi figure, as was at first intended, it is now proposed to have electric lights placed, with strong reflectors around the foot of the statue, casting a very strong light upon it, and thus giving it the appearance during the night of a shining statue. Then a great vertical beam of light will spring from the uplifted torch, whose light, it is calculated, will strike the lower stratum of clouds, when any are over it, enabling the reflection upon them to be seen far out at sea.

Mayor Grace, of this city, has appointed a committee to investigate the scheme of Edward Patterson, representing the New York Water Power Company, who claim to have discovered that there is in this city a water-bearing strata into which wells could be driven which would furnish a daily supply of 5,000,000 gallons of fresh water. This supply would be drawn from the wells and from storage tanks distributed through the dry-goods district. Hydrants would be placed at various points and water forced to them by powerful engines.

Chili is making preparations to hold an exposition of American manufacture: only at Santiago, the capital, opening on the 1st of October. Señor Alejandro Thompson Rei, corresponding member of the National Agricultural Society of Chili, has been sent on a special mission to this country to promote the objects of the enterprise. He has held conferences with the merchants of Milwaukee, Racine and Chicago, and is now in St. Louis with a similar view. He points out that the United States has only a meager share of her foreign trade as compared with England. In 1884 the importation of cotton goods from England amounted to \$4,000,000, as against \$200,000 from the United States. In the importation of agricultural implements Chili does a large trade, which is divided almost entirely between England and the United States, but the latter country gets but a small share—about the same proportion as for cotton.

The reorganized "Continental Conference" of steamship lines, after six months of bitter warfare in the matter of steamer rates, went into effect last Friday. The new rates are now one-third less than those of the English lines.

Hon. S. S. Cox, the new minister to Turkey, decides that he must accept the duty to which he has been assigned.

The Labor Bureau Commissioner of New York is empowered to examine under oath, in his efforts to obtain statistical information, employers of labor in mines, factories, workshops, warehouses, elevators, foundries, machine shops and other manufacturing establishments, as well as theatrical managers and lessees. The penalty for refusing to give correct information in response to his inquiries is a fine of from \$100 to \$200.

More than one-third of Massachusetts' towns are losing population, and some of the oldest schoolhouses are being closed for lack of pupils.

The newly opened Brooklyn Elevated Railroad is successful beyond expectations in sharp competition with the surface roads.

The monthly statistical publication of the Agricultural Department for May contains a comprehensive statement of wages paid to farm laborers in all parts of the country, based upon what Mr. Dodge, the statistician of the department, believes to be entirely trustworthy data. The following statement shows by sections the cash rates where board is not furnished, showing the gradual decline of inflated values of the speculative period, the undue depression of the era of panic and the ultimate recovery in 1882, with the changes indicated by the present returns of May 1, 1885:

States.	1885.	1882.	1879.	1875.	1869.	1866.
Eastern.	\$25.30	\$26.61	\$30.21	\$28.96	\$32.08	\$33.30
Middle.	25.19	22.24	19.69	36.02	28.02	30.07
Southern.	14.27	15.30	13.31	16.22	17.31	16.00
Western.	22.29	25.63	20.38	25.69	27.01	28.91
California.	38.75	38.25	41.00	44.50	46.38	35.75

The report closes with the practical suggestion that in the manufacturing towns and cities offices be opened, either by the labor unions or by benevolent citizens, through which communications may be opened between unemployed city workmen and farmers needing help.

Negotiations for a commercial treaty between England and Spain have terminated without result.

John Roach's Dolphin, built under contract for the United States Government, is required to make 16 knots per hour for six consecutive hours. The test is acknowledged to be a severe one, but not unreasonable.

On the first trial the steel shaft broke, on the second there was a heated journal, caused by grit in the oil, and on the third trial, last Monday, another heated journal brought the trip to a premature end.

The Trades Assembly of Chicago has decided not to permit Socialists and Anarchists to take part in its annual parade, and it forbids the carrying of any banner in the procession other than those of the trades unions and the American flag.

Extensive preparations are making in London to meet the increased traffic expected from the adoption of the 6-penny rate for telegrams. It is expected that in the first year there will be an increase in the total number of telegrams of 30 per cent.

American machine-made shoes are having a large sale in Europe, and several large German manufacturers are said to have their representatives in this country, learning our methods.

Various plans are under discussion designed to facilitate the transportation of merchandise on the west side of New York, and especially to abate the "steam dummy" nuisance. The most obvious remedy is the construction of an elevated railway parallel with the river front, and in connection with a system of fire-proof warehouses. An additional surface railroad, which some recommend, would render necessary the widening of West street.

With the capture of Riel and Poundmaker, the rebellion in the Northwest has been summarily crushed out.

The silk industry is attracting a good deal of attention at present throughout Mexico. Recently an exhibition of the reeling from cocoons of Mexican silk was given in the presence of President Diaz and other officials, which is said to have been highly satisfactory.

California trade is well sustained. The exports of merchandise from San Francisco for the first quarter of the year exceed \$15,000,000, being in excess of same period in 1884 of about \$3,725,000, while the combined exports of merchandise and treasure for the quarter aggregate in round figures \$21,782,000, or an increase over same period of 1884 of more than \$5,000,000.

A new Foreign Fruit Exchange has been opened in this city on Monday, at 64 Broad street, Geo. C. Giles, president. The objects of the new organization are stated to be to foster trade and commerce; to protect it from unjust and unlawful exactions; to reform abuses in the trade; to diffuse accurate and reliable information among its members as to the standing of merchants, and other matters; to produce uniformity and certainty in the customs and usages of trade; to settle differences between its members and to promote a more enlarged and friendly intercourse between merchants.

The Champagne, the first of four steamers now being built in French shipyards for the Compagnie Generale Transatlantique, was launched at St. Nazaire on the 15th inst. She is the largest merchant vessel ever built in any French shipyard. She is constructed of steel, her dimensions being: Length, 492 feet; beam, 51 feet 6 inches; depth, 24 feet 6 inches; displacement, 10,000 tons.

The Commissioner of Patents sustains the findings of the examiners in awarding priority of invention to S. D. Field, of New York, in the application of electricity as a motive-power to railway cars by means of the rails.

Lieutenant Zalinski, of the Fifth United States Artillery, is a torpedo expert. He claims that our system of submarine torpedoes is the finest in the world, but that it is not a sure means of defense. He would agree to sweep a pathway through all the torpedoes that might be put in Sandy Hook channel, by arranging a counter mine of torpedoes down to clean them out. Start down, say, three turtle-backed propellers, drawing a line of floats 1/2 mile long, detached, and governed by an electric wire. From the floats he would suspend torpedoes in such a position that the radii of effectiveness of their explosions would destroy anything placed on the bottom or floating. In a short time a channel could be cleared out in this manner, so that a ship could pass up in safety. Shooting torpedoes are unreliable and can easily be guarded against.

In accordance with the suggestions of Carroll D. Wright, chief of the National Bureau of Labor Statistics, Secretary Lamar has appointed the following special agents, some of whom will visit Europe to investigate the causes of periodical depressions, labor strikes, &c.: Charles B. Judd, of Colorado; Jonas Libby, of New York; Elgin R. L. Gould, of Maryland; Henry C. Wilson, of New Jersey; William H. Stinson, of New Hampshire; James Reed, of Massachusetts; Arthur B. Woodford, of Connecticut; J. H. Groves, of Delaware; H. L. Ihmson, of Pennsylvania; Gregor Fox, of Pennsylvania; Charles F. Gilliam, of Ohio; William S. Maudley, of Ohio; Ringgold W. Browning, of Maryland; William C. Trenholm, of South Carolina; Henry Newman, of Missouri; Henry Jones, of Georgia, and Silenus O. Ward, of New York. It is learned that in making these appointments the Secretary acted without regard to the question of the political affiliations of the persons to be appointed, and that they were selected also without respect to any theories they might entertain upon economic questions.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, May 21, 1885.

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The Western Iron Manufacturers' Demand.

We published last week a telegraphic dispatch giving briefly the scale of wages demanded by the Western iron manufacturers for the ensuing year. In another page of this issue we give this scale in full. It will be remembered that the workmen demanded the scale now in force, with some additions that were practically advances, and the manufacturers retort with a scale making considerable reductions. The proposed scale for boiling has been reduced 50 cents a ton, or on a 2½-cent card from \$5.50 to \$5, a little less than 10 per cent.; the muck rolling scale from 12½ per cent. of the price of boiling to 10 per cent., or on a 2½ card about 20 per cent.; bar rolling and heating from 70 cents to 60 cents a ton, 14 per cent.; nail-plate rolling, 63 cents to 50 cents, or 20.6 per cent.; hoop and cotton tie, 5 to 15 per cent.; scrapping and bushing, \$2 to \$1.50, or 25 per cent.; shingling muck iron 33½ per cent. reduction, and knobbling from \$4.70 to \$4.20, or about 11 per cent. These are the changes in the scale.

In the explanatory remarks accompanying the scale and the extras there are quite a number of changes, the effect of which it is well nigh impossible to estimate, as the amount of the extra work done at different mills varies so greatly. In the memorandum of agreement are very important changes. Heretofore the scale has stopped at 2½ card for iron; the demand is that the sliding scale shall follow the card up and down. For some years the scale has been made absolute for a year; a clause is inserted that gives either party the right to terminate the agreement upon 60 days' notice.

As to the total effect of these changes the Pittsburgh papers report Mr. Martin, the secretary of the Amalgamated Association, as giving the following statement, basing his figures on the supposition that the card be reduced to 1½-cent rates:

A reduction in the price for boiling from \$5.50 to \$4 per ton, a reduction of \$1.50 per ton, over 27 per cent.

Muck rolling from 63½ cents to 40 cents per ton, a reduction of 23½ cents per ton, over 42 per cent.

Bar-mill rolling and heating and nail-plate heating from 70 cents to 45 cents per ton, a reduction of 25 cents per ton, over 42 per cent.

Catching on bar mill from 43½ cents to 22½ cents per ton, a reduction of 21¼ cents per ton, over 50 per cent.

Nail-plate rolling from 63 to 35 cents per ton, a reduction of 28 cents per ton, over 46 per cent.

On 12-inch mills (small bar mills) the heater heretofore got large bar mill price, but in their proposition he would be in the dark as to what he would get for his work, they demanding that he "be paid by the company," but no figures are given.

Guide-mill rolling, taking common sizes made from piles as a base, is reduced from \$2.30 to \$1.60 per ton, reduction of \$1.30 per ton, over 45 per cent.

They are not satisfied with this very small reduction on straight sizes, but they propose to pay nothing extra hereafter for any fancy iron or old shapes or sizes made on this mill, and for which they undoubtedly get extra prices. Figuring on the extras heretofore paid for on this mill, the reduction would not fall far short of 60 per cent.

The hoop and cotton-tie mill scale they have figured down very fine, so fine that the roughers in those mills could not make over \$1.35 per day at their proposition.

The reduction on the plate-mill roller, on extras alone (orders that called for extra prices), amounts to over 24 per cent.; and for similar orders on sheet and jobbing mills it amounts to over 10 per cent.

Scrapping on sand bottom is reduced from \$2.30 to \$1.49 per ton, a reduction of 71 cents per ton, over 41 per cent.

The reduction on shingling will be over 33 per cent., and that on knobbling over 31 per cent.

Taking the 13 leading branches, it makes an average reduction of 36 per cent.

That the changes demanded by the manufacturers are radical is beyond question. It is also true that the demand at this time is greater than it would have been had the workmen consented in the past three years to such reductions as the state of trade justified. But it is by no means evident that the changes are too great in view of the relative selling prices of to-day and those of 1881, when the present scale was adopted. It is beyond question that the ironworkers have not borne their share in the reductions of the past three years. The demand of the manufacturers is an attempt to equalize.

The workmen, at a conference with the manufacturers, rejected with scant courtesy the scale proposed, and upon their motion an adjournment without date followed. The interviews published in the daily journals of Pittsburgh since the conference closed indicate that both sides would be glad of an opportunity for another meeting, but they both most earnestly assert that they will not ask for it. It is possible that some way may present itself permitting the calling of another conference without an apparent yielding on either side. The probabilities are, however, that matters will drift along as at present, and the 1st of June will find the scale unsigned except by a few individual works. It is evident that the manufacturers do not expect absolute unanimity. They feel so confident of their position that they do not hesitate to say that the condition of certain mills is such that it is obligatory upon them to run. Indeed, they believe that they will be stronger if some mills continue in operation, as it will enable them to fill pressing orders.

It is, of course, extremely difficult to foresee what will happen on the 1st of June. It is 10 days away, and affairs may change materially in that time. It looks as we write as though there had never been such unanimity nor greater determination among the manufacturers than at the present time, and there never was greater need. On the other hand, the Amalgamated Association never was weaker. To be sure this union has shown a wonderful vitality in the past, and has shown its power to compel obedience to its dictates from non-union men. But if it still possesses this power it is in a very much less marked degree. It has lost the nailers, and the finishers are not the loyal servants they have been. The lodges in quite a number of mills in and near Pittsburgh have been broken up, and several have had their charters revoked. These latter are running mills working in defiance of some of the rules of the association, and will continue to run after June 1 without signing the scale. As we have already indicated, the strength of the Amalgamated Association is, where it always has been, in their belief in the weakness of the manufacturers. They base their hopes in the expectation that certain mills that have been recently in financial difficulties will at once sign the scale. They claim that 10 mills will do so, but fail to give details when they are called for. They will doubtless learn their error in calculation on the 1st of June should they persist in their demand.

Iron Ore and Fuel in our Blast Furnaces.

Mr. G. W. Cope, secretary of the American Iron and Steel Association, has carried through a very valuable series of investigations on the quantity of iron ore and fuel used in American blast furnaces in 1884, which we present elsewhere. The statistician simply presents the bare figures, leaving the deductions to be drawn by others. The first similar work was done by Mr. James M. Swank in his famous census report, and this affords some means for comparison. The census did not discriminate between the quantities of fuel used at furnaces the main consumption of which was some other class; the coke consumed in some States partly went to anthracite furnaces, and the fuel consumption of the coke furnaces would be too high if estimated on the basis of these returns. Of course, occasionally, a little coke is used in charcoal furnaces, but the quantity is too small to affect the results. The circumstance referred to makes it impossible, however, to make comparisons between the census year and 1884 on the basis of the figures at hand in such States as

Pennsylvania or New York. In a number of other States in which no anthracite is used this source of error does not exist. On the other hand, the problem is complicated in another way. A considerable number of coke furnaces use raw bituminous coal, the quantity per ton being considerably greater. In the Southern States this matter is of comparatively little significance. It does, however, make a very great difference in the case of Ohio, whose furnaces are made to appear voracious consumers of fuel. It may be noted in this connection that the use of raw bituminous coal is falling off considerably. In the census year it was 1,051,753 tons on a total product of coke and coal pig of 1,515,107 tons. In 1884 it had dropped down to 326,986 tons of raw coal. We have endeavored to arrive at some rough approximation by converting the raw coal to about its equivalent of non-volatile matter by deducting 25 per cent. from the quantities of raw coal used. In this somewhat crude manner we arrive at the figures bracketed. The question affects Ohio most seriously. During the census year there were used in its blast furnaces 418,624 tons of coke and 638,711 tons of raw coal, or 60 per cent. of the latter, while in 1884 the figures stood 597,042 tons of coke, 249,992 tons of raw coal, or only 30 per cent. There is a palpable error in the census return of the quantity of fuel used in Illinois.

Coke Consumption per ton of Iron.

	Census 1880.	Year 1884.
Virginia	1.97 (1.88)	1.51
Georgia, Alabama and North Carolina	1.59 (1.58)	1.52
West Virginia	2.06 (1.95)	1.46
Tennessee	2.14 (1.82)	1.74
Ohio	3.39	1.30
Illinois	1.74 (1.67)	1.43

In Virginia there was only one coke furnace working in 1879-80, while in other sections of the South there has been an improvement in the fuel consumption, a lowering probably largely due to the fact that the majority of the furnaces making up the average of 1884 are of modern type. It is a striking fact, however, probably accounted for largely by the better grade of fuel in the Southern States, that the average coke consumption is lower in the latter, always barring out Ohio and Kentucky, by reason of the use of raw coal, and Colorado with its comparatively poor coke. Mr. Cope makes the average of the whole country 1.36, but a due allowance for the raw coal cuts this down to 1.31. Another circumstance that probably also accounts for the larger fuel consumption of Southern furnaces is the fact that their ores are lower in grade. The average for the whole country is 53.4 per cent.; for Virginia, 43.8 per cent., Tennessee, 43.3 per cent., and Georgia, Alabama and North Carolina, 43.1 per cent. In the census year the average yield of the ore was 52.1 per cent., not taking any account of the mill cinder, which, by the way, Mr. Cope does not appear to take into consideration. In the census year this cuts down the average to 49.6 per cent.

In a general way it appears that there has been a saving in fuel, though the absence of specific figures covering the whole country during the census year makes it impossible to draw general conclusions. An interesting comparison is made possible, however, in the consumption of fuel of the charcoal furnaces. Choosing the leading producing States we have the following figures, in bushels per gross ton:

Consumption of Fuel in Charcoal Furnaces.

	Census of 1880.	Calendar year 1884.
New York	126	128
Pennsylvania	146	164
Maryland	138	143
Virginia	154	173
Kentucky	163	165
Tennessee	167	153
Ohio	179	172
Missouri	113	118
Michigan	97	97
Average of country	131	123

It will be noted that, so far as the average of the whole country is concerned, there has been a slight improvement. Turning to individual States we find some striking changes which it would be impossible to explain without additional data. Thus Ohio, Pennsylvania and Virginia show a marked increase, possibly due to the fact that the quality of the fuel is not what it used to be. Michigan has gained a little, a fact possibly due to the concentration of the make to more modern furnaces.

It may be of interest to contrast the American results with those available from foreign countries. The latest complete German statistics available are those of 1882. While they are very elaborate, so far as the iron-producing raw material is concerned, they do not give the fuel consumption. One hundred and seventy furnaces, running 8055 weeks, produced 2,432,476 tons of coke pig from 4,748,438 tons of domestic ores, 712,645 tons of imported ores, 538,127 tons of cinder, 7239 tons of blue billy and 18,689 tons of miscellaneous scrap, a total of 6,024,138 metric tons of material. This is equivalent to an average yield of 40.4 per cent. It should be noted, however, that 754,192 tons of the ore used was charged into the furnaces in a roasted condition.

The mineral statistics of Great Britain unfortunately present the statistics of fuel consumption of the blast furnaces in a different manner, the Keeper of the Records having estimated the quantity of coal required to produce the coke used, without presenting the figures referring to the latter. It is impossible to arrive at a general figure for comparison which would include good, bad and indifferent. The average for England and

Wales was in 1882 40.86 cwt., or 2.04 tons of coal per ton of iron, while the average in Scotland was 45.33 cwt., or 2.27 tons, the total average for the country being 41.45 cwt., or 2.07 tons. Mr. I. Lowthian Bell places the fuel consumption in the Cleveland district at about 1.15 tons of coke per ton of iron.

The ore consumption of Great Britain in 1880 was 18,026,260 tons of domestic and 3,606,331 of imported material. This neglects entirely the amount of mill cinder used. In order to get at closer figures we have assumed the quantity to be not less than 500,000 tons, and with that allowance we arrive at the conclusion that in 1880 the average yield of the domestic material was 33.5 per cent., while the average of the whole smelted was 35.8 per cent.

Though the latest official statistics by the Mining Department cover only the year 1882, the French figures are very complete and go into detail very carefully. From the official tables we gather that in making 1,940,002 metric tons of coke pig iron, which includes 17,113 tons of ferromanganese and spiegelisen, there were used 5,136,300 tons of domestic and imported ores, 2,482,179 tons of coke, and 67,081 tons of raw coal, equivalent to an average yield of the ores of 37.8 per cent. and an average fuel consumption of 1.3. The charcoal furnaces produced 55,163 tons of pig with 118,000 tons of ore and 63,906 tons of fuel, the latter including some raw wood. This is equivalent to an average yield of 46.7 per cent., and a charcoal consumption of 1.14.

The following table summarizes these data:

	Fuel consumption.	Ore, percentage of iron.
United States (1884)	53.4	53.4
Anthracite	1.52	53.4
Coke	1.31	53.4
Charcoal, bushels	193	53.4
Great Britain, raw coal (1880)	2.07	33.5
France, coke (1882)	1.3	37.8
Charcoal	1.14	46.7
Germany, coke (1882)	1.14	40.4

Our furnaces, it will be noted, are found generally to use much richer ores than their rivals in foreign countries, a fact which is the direct result of long haulage, either of raw materials or of finished product. It would not be fair to infer from the figures given that we have natural advantages in the grade of iron ores which other countries do not possess. Our rich Lake Superior ores, for instance, are taken over distances which would be impossible elsewhere. In the matter of fuel consumption it will be noted that we stand about equal to French works, the only ones with which a direct comparison is possible. The comparatively low figures of raw coal used in England would indicate, however, that there the quantity of fuel used per ton of iron is slightly less than with us, taking into account the lower grade of ore.

The Value of Receipts.

There is no document so simple and so common as a receipt for money paid, and yet there are various questions which arise in connection with it often very perplexing to business men. There is no question more frequently asked of lawyers than whether a debtor has the right when he pays the money to demand a receipt in case the creditor refuses to give one, and also whether he would have the right to retain the money and refuse to pay it until the receipt was given. It is a generally prevailing opinion among mercantile men that there is such a right. But this view is entirely erroneous and utterly without foundation either in law or usage. The law is perfectly well settled, and cannot be disputed, that the person owing money must pay it when it is due, and has no right to demand a receipt, unless he has specifically contracted for one at the time of incurring the debt or liability. The reasons for this are perfectly obvious. In consideration of the loan or the credit he has promised to pay the money at a certain time. The creditor is entitled to the money, and the debtor cannot put the creditor to the trouble or annoyance of writing or signing a receipt. Besides, when the debtor gets the loan he obtains all he has contracted for. The value of a receipt consists in the fact that it is proof—one method, and the best method, of establishing the fact that the debt is paid in case that point should ever be contravened. The proper thing for the debtor to do, and the safe thing in case of the refusal of the receipt, is to bring witnesses with him when he pays the money. Of course if he can prove the payment without witnesses that is sufficient, but it is sometimes very difficult. If the debtor refuses to pay the money under these circumstances until he gets a receipt, he is liable for the interest, all damages and the possible costs of a lawsuit—consequences which ought to be sufficiently serious to deter any man.

Another question about which there is considerable doubt concerns the right of the creditor, after he has given a receipt, to deny the truth of the facts it states—that is, whether he can claim that the debt was not paid after all. Of course it is not usual for a man to give a receipt unless he has good ground to do so, but sometimes through mistake or inadvertence or some other reason he may sign a receipt which is not true. The ordinary rule of law about written documents and contracts is that verbal evidence cannot be permitted to contradict or vary them. But it is desirable to remember that this rule does not apply to receipts. It is very common for receipts in full to be given,

and, as the debtor generally draws them up and the creditor merely signs his name, this gives the debtor an opportunity for committing a fraud. Very frequently the creditor signs without reading. He may think that he is receiving for one debt where there are several due him still unpaid, while, in fact, he is giving a receipt in full. It would be absurd to say that he could not recover the unpaid debt, provided he can prove that it is unpaid by any kind of satisfactory evidence, even though it contradicts the receipt. This would simply be putting a premium on fraud.

Another point of interest about a receipt in full is that even though a creditor signs it with full knowledge that there are other unpaid debts due to him, and with the intention of discharging the debtor, and this is an understood arrangement between them, it will not prevent him from recovering those other debts. There is no consideration for such an agreement, and the only way in which such an intention can be effected so as to bind the creditor legally is to put a seal on the receipt or to execute a formal release under seal.

Position of Tin.

Since we last noticed tin editorially, on March 5, a great many influences have been at work in London and New York to alternately depress and buoy up the metal. The statistical position at the end of March compared with that of the previous year was as follows:

	1885.	1884.
Straits and Australian in London, spot	5,253	5,850
Straits and Australian in London, landing	963	386
Straits, adroit	1,327	1,320
Australian, adroit	1,265	1,222
Banca, on warrants in Holland	1,794	1,346
Billiton, spot	1,357	1,396
Billiton, adroit	828	887
Visible supply in England and Holland	12,407	12,286
Visible supply in the United States	2,300	2,350
Total	15,107	14,636
Prices of Straits and Australian	£78. 5/ 8	£82. 15/
Deliveries during March in London	1,481	1,648
Deliveries during March in Holland	450	503
Total	1,931	2,211

While the visible supply in Europe and America was but 471 tons larger, the price was £4. 10/ per ton less. Early in April it was believed that after the defeat of the French at Langson the war with China would continue, and that the Chinese demand for tin in the Straits Settlement would, in such an event, cease or at least be hampered. Contrary to expectations, China soon after sued for peace, and all misgivings disappeared, thus placing the metal in a much more favorable position. Subsequently London was plunged into excitement by the Afghanistan dispute, demoralizing the market for all commodities but grain. Tin also felt the effect of it and declined 15/ in consequence. Upon further reflection and a calmer view of the probable effect on the supply of tin from the Straits in the event of an Anglo-Russian war the conclusion was arrived at that, if anything, the supply might be lessened, at least during the first four months of such a war; that freights and insurance would be higher, while there would be nothing to interfere with the usual consumptive demand. Encouraged by these considerations speculation for a rise was resumed in the London market, the movement being headed by the leading operator, and Straits tin, early in May, had recovered to £80. Statistics for April in this market showed the following movement:

	1885.	Tons.
April 1, stock	1,600	
April 1-31, imports	600	
Total	2,200	
Consumption April	600	
May 1, stock estimated	1,600	
Adroit	1,300	
May 1-31, visible supply	2,900	

The position in Holland is shown in the following table:

	1885.	1884.	1883.
Stock, May 1, Banca on warrants in the hands of the N. Trading Company	46,669	29,483	32,389
Stock Billiton in Amsterdam and Rotterdam	40,085	41,718	67,250
Total	86,754	71,201	99,639
April deliveries of Banca	10,752	13,600	11,261
April deliveries of Billiton	6,900	8,312	12,145
Total deliveries	17,652	21,912	23,406
Deliveries since January 1, Banca	31,176	42,594	41,373
Deliveries since January 1, Billiton	25,859	38,311	31,549
Banca adroit	4,220	14,000	20,000
Stock accumulated for commission sales	118,638	88,903	97,165
Billiton adroit	45,706	30,387	40,250
May 1, price of Banca	fl. 49½	fl. 53½	fl. 59½
May 1, price of Billiton	fl. 48	fl. 51½	fl. 54½

While the visible supply on this coast had increased some 600 tons, the stock in Holland, as shown above, was considerably larger than last year. Speculation for a further rise was meanwhile resumed with all the greater vigor when the outlook became decidedly peaceful, the price toward the middle of May being pushed to £85. The speculation was favored by cable news from the Straits, reporting light receipts there and little disposition to sell in excess of these. The shipments thence to the United States during the first two months of the year have been unusually light, being only 5465 piculs, against 9341 in 1884 and 23,465

in 1883. Whether the mere fact of a more peaceful aspect is sufficient to warrant an appreciation in value so important and rapid may appear doubtful.

On this side the severe and long winter has crippled the spring trade, which has proved a great disappointment. The many railroads that have gone into the hands of receivers during the past 15 months clearly show that the resumption of railway building on a scale to favorably influence general trade, and the iron and metal trades in particular, is still far off, and that the summer now drawing near is likely to be unusually dull in business. The metal trade is evidently little inclined to anticipate requirements in anything but what may present plausible reasons for appreciation because unduly depressed, and tin certainly cannot lay claim to that position. We do not believe, therefore, that a further advance in the price of tin would receive much encouragement and support at the hands of our metal trade.

The Meeting of the Iron and Steel Institute.

The English technical journals just at hand contain the usual full accounts of the proceedings of the meeting of the Iron and Steel Institute, held at Westminster the second week in May. There is probably no event looked forward to by metallurgists with such expectation as the periodical gathering of that great body, which is becoming more and more cosmopolitan. The number of contributions of authors from other countries than England is growing, and at the last meeting Dr. Wedding appears as a representative of German methods of investigation, and Mr. Andrew Carnegie, an American ironmaster, seeks glory as a writer on technical subjects.

It has been always characteristic of the meetings of the Iron and Steel Institute that its members have generally discussed some of the "burning questions" of the day, a peculiarity which has given their work a freshness and vigor not approached by any similar technical body. One of the leading topics during the meeting under consideration has been the utilization of the by-products of coking and the effect of the modifications in coking methods upon the value of the product as a blast-furnace fuel. The leading paper was by Mr. I. Lowthian Bell. In his usual thorough manner he has carried out a series of trials, under as closely identical conditions as was possible and extending over weeks, of the value of ordinary beehive coke and of the product of a plant of the Simon-Carves ovens, using coal from the same pit, but arranged to recover the by-products. Broadly the result he reaches is that the coke made in the beehive oven was 10 per cent. better than the fuel produced in the oven of the Simon-Carves type. This Mr. Bell attributes to the fact that the physical structure of the coke is such that the solvent action of the carbonic acid in the coke is greater on the latter fuel. The result is broadly that the extra yield of the coke in the closed oven over that in the beehive oven is practically lost when it comes to be used in the blast furnace. This eliminates from the estimates of profit made on behalf of those introducing the recovery of by-products from closed ovens all right to claim for returns due to greater yield, provided the coke is used for blast-furnace work. Mr. Bell distinctly disclaims the general application of his conclusions to all coals or to other uses.

It seems to us that it simply bears out and confirms the experience had in this country as well that beehive coke is better adapted for smelting iron ore than fuel made in the closed ovens. Mr. H. Simon, of Manchester, in a paper on the development of the Simon Carves coking process rather sophistically urges that "the use of coke similar in its nature and produced in similar ovens is continually and surely spreading in the blast furnaces of France, Germany and Belgium." This is probably so, but the question, so far as the Durham district in England and the Connellsville district in this country are concerned, is whether it will pay to deteriorate the quality. Mr. Bell estimates, on the basis of figures given by advocates of the system, that there is a gross profit on the by-products of nearly £10 per oven, while the extra cost of the plant is from £100 to £120 per oven. The gross profit will have to bear the charges for increased interest and redemption of capital and of greater wear and tear of a much more complicated plant. These strictures, of course, refer specially to the Terrenoire form of apparatus; they may not apply to those designs, like the Aitken oven, in which the beehive type is not departed from. It is just to state, however, that Sir B. Samuelson and others brought forward data weakening the evidence produced by Mr. Bell. We have already referred to the paper contributed by Mr. Simon. The only really interesting point brought out in it is the fact that efforts are now being made at Terrenoire and by Pease & Partners, in the Durham district, to recover the lighter products of distillation, and notably the benzol, the heavy portions of the oils obtained in distilling the tar being used as absorbents. This is a promising departure and may aid to put the recovery of by-products on a firmer basis. A third contribution on the same general subject was that of Mr. Watson Smith, entitled "Recent Results with Regard to the By-products Obtained in Coking Coal in the Simon-Carves

Coke Ovens;" and a fourth, that of Prof. Henry E. Armstrong, on the "Methods Proposed for Coking Coal and Recovering Volatile Matter." A novel effort in the same direction, the recovery of the by-products, is that described in a paper by Mr. John Head, who is associated with the Siemens. He has designed a modification of a gas producer with the object of extracting tar and ammonia from producer gas. The subject chosen by Mr. Andrew Carnegie was "On Natural Gas and Its Application to Manufacturing Purposes." With the exception of some very interesting analyses and calculations made by Mr. S. A. Ford, chemist of the Edgar Thomson works, which we shall present in full, it does not contain data with which the American public is not familiar through the somewhat voluminous literature on the subject.

A contribution somewhat sensational in its character is that of Mr. T. Nordenfelt, the well-known manufacturer of guns, on what he calls "Mitis" wrought-iron castings, which, we may state, have in a quiet way attracted some attention in this country for some time. They are the result of a method elaborated by Mr. Wittenstrom, a Swedish engineer. Reserving a fuller presentation of Mr. Nordenfelt's paper for a future occasion, we may state now that the process consists of melting wrought-iron scrap in crucibles without the use of any other additions than such chemicals as have been found most suitable for the purpose. The fuel used is petroleum residuum. Thus far the efforts of those at work in producing these castings have been directed toward the manufacture of small articles in competition with malleable castings produced at about the same cost or at slightly lower figures. When using high-class raw materials the castings were found to have a tensile strength about 20 per cent. higher than that of the wrought iron used, while the elongation is slightly less—from 5 to 10 per cent. Mr. Nordenfelt does not give details concerning the "chemicals" used nor on the method used by him in molding, which has really been the great difficulty encountered in all efforts to make smooth castings with metal requiring high temperatures for melting.

The microscopical investigation of the structure of iron and steel has not had that attention heretofore in England which its promise of fruitful results would appear to warrant. It has been brought before the Iron and Steel Institute for the first time by Dr. Herman Wedding and by Dr. H. C. Sorby. The former has followed in the footsteps of Herr A. Martens, whose earlier researches have been alluded to in a paper before the American Institute of Mining Engineers by Mr. J. C. Bayles. Dr. Sorby, in his last contribution reaches the conclusion that the various kinds of iron and steel seem to be varying mixtures of six or seven substances having very different properties.

The meeting was memorable through the presentation of a presidential address, the first, we believe, coming from that source, by the venerable metallurgical writer, Dr. Percy. It is a lengthy document, touching on a wide range of subjects without developing any strikingly original views. The Bessemer medal was presented to Prof. Richard Akerman, whom many in this country became acquainted with during the Centennial Exhibition.

Building societies, or building associations, as they are very commonly called, in some sections of the country have been a favorite means of deposit for small savings for many years. They have also been of great help in supplying the capital for building houses of moderate cost, thus furnishing clerks, mechanics and others of moderate means with their own homes. One of the daily papers gives some statistics relating to these useful institutions that cannot fail to be of interest to our readers. Building associations organized and conducted mainly by working people are in existence in New Jersey, Maryland, Massachusetts, Ohio, Tennessee and on the Pacific Coast. They exist in some other States to a limited degree, but are not as prominent as in the sections specially mentioned. The first building association is believed to have been the Oxford Provident, which was established in 1831 in Frankford, Philadelphia. The initiation fee of this association was \$5 and the monthly dues were \$3. In 10 years and 6 months the dues and profits brought the shares to a value of \$500 each. At present there are about 1600 building societies in the State of Pennsylvania alone. The average number of shares is 1000, and the par value is \$200. The usual life of the building association is about 11 years. At present associations existing in Pennsylvania are distributing to their members nearly \$30,000,000 annually, and they hold about \$160,000,000 of securities. It is asserted that in the 20 years from 1862 to 1882 the building associations in Philadelphia erected houses to one-fifth the value of the real estate of that city.

An anvil or mandrel for forming rings and articles of similar form has been patented by the Wiley & Russell Mfg. Co., of Greenfield, Mass. The mandrel is made of cast iron and is cone-shaped, tapering from top to bottom. Upon the exterior of the cone a groove is sunk about 2 inches deep, which extends down from the apex to the base. This groove is to receive the ends of the tongs which hold the article to be forged. The claim of the patent covers a forging mandrel having a groove formed on or beneath its exterior surface.

The Cost of Producing Bar Iron in Eastern Mills.

To the Editor of The Iron Age: Your letter in the current issue of The Iron Age, headed "The Labor Situation in the West," treats on a subject of vital importance to all wrought-iron manufacturers at this juncture. The relative cost of producing bar iron east and west of the mountains has long been a subject of discussion between the two sections, but bids fair to be settled by the present attitude of the Western puddlers. While I am unable to judge of the accuracy of the Labor Tribune's estimate of Western cost, not having seen their itemized figures, I am compelled to say that their total cost of producing bars in Eastern mills is uncomfortably near the truth, although faulty in detail, as pointed out by you. As Eastern manufacturers cannot better their situation by closing their eyes to the truth, I would invite their criticism on the following estimate, which, I take it, will fairly represent the average cost of an honestly-made refined bar iron, from all new metal, in rolling mills in Eastern Pennsylvania:

Pig iron.....	\$15.00
Waste in puddling, 60% ; reheating, \$1.50.....	2.10
Ore for puddling, 1 1/2 ton at \$6.....	9.00
Coal, 2 tons at \$2.45.....	4.90
Labor.....	10.00
Contingent expenses—castings, fire-brick, sand, wood, oil, gas for lighting, &c.....	3.50
Office expenses—postage, stationery and salaries.....	.50
Insurance and taxes.....	.10
Repairs.....	.30
Total.....	\$38.30

This is cost at the mill. Now let country mills add, say, \$1.25 per ton for freights and commissions, and then let them sell their product at \$1.75 at tide (if they can), and where is their profit? "In the extras," I hear my friend "Hopeful" exclaim, forgetting that he, with many other mill owners, bait their hooks with all the extras if necessary to secure orders. I do not think this estimate of cost far out of the way. Two tons of coal to the ton of finished bars may seem high, and the coal weigher's daily report may show a much smaller consumption, but at stock-taking time the big stock of coal found in the books somehow cannot be found in the bins. Sundry expenses—\$3.50 per ton—is entirely too much in estimating cost, but the miserable balance-sheet comes around occasionally, and then we wonder how we forgot so many items in our estimate. At the risk of being considered a bore, let me for a moment compare Eastern with Western cost. Where is their advantage? Not in pig iron, not in ore or contingent expenses or repairs or insurance and taxes. It must, then, be in coal, and, as I understand the Labor Tribune's claim, in labor. I doubt the correctness of this claim, but in fuel the advantage is all with our Western friends. Two dollars per ton, I am told, is a fair cost of the fuel in finished bar iron; if correct, this would make Western cost \$34.90. Is this correct? Mr. Jones or Mr. Bennett or Mr. Oliver and scores of others can tell us. Will not one of them please "rise and make a few remarks?" Respectfully,
EASTERN PENNSYLVANIA.

Iron-Making in the Cleveland District, England.

To the Editor of The Iron Age: Noticing your letters contrasting English and American blast-furnace practice and your quotations from Mr. Bell's latest work, I would say there might arise misunderstandings from a lack of noting the particular emphasis which Mr. Bell makes when he speaks of their "best arranged iron works and rolling stock, particularly in the Cleveland district." There is no locality in the world so favorably situated for the production of a ton of pig iron as the Cleveland district of England, and there is no iron-producing section to which so much attention has been given to the handling of the crude stock. Railway plants have given their aid in getting the stock into the calcining kilns and coke bins of the furnaces without the use of shovels. The ore is received with the utmost regularity direct from the mines, which is but a very short railroad haul. The coke is received from the Durham mines, and also comes with the regularity of passenger trains. By the use of elevators the coke and ore in the railroad cars are lifted to the top of the "gantry," and the railroad crossing the calcining kilns and coke bins has a slight declivity of about 3/4 inch to the fathom, and but two men handle the coke, ore and limestone, delivering all the stock for two or three furnaces, then drop the cars to level of the railway track below. As the ore is drawn through shutes from the calcining kilns into the buggies of the blast furnaces without shoveling, and the coke and limestone are drawn from the bins in the same manner, and as these receptacles are placed close up to the furnace, the great economy in the labor of charging can be readily understood.

Now, when Mr. Bell made his visit to this country there were very few, scarcely any furnaces I might say, which were provided with any better means of getting their cinder away than running the cinder into holes in the sand, lifting the lumps by cranes and shoveling the scraps of the cinder into carts. This cinder snatching in our hot climate requires a great many men, and we really require the ordinary provisions for getting rid of our cinder more than the English do. It will be observed in Mr. Bell's writings, I need not quote particularly, that full credit has been given to the labor of this country, and he considers that one reason why we get more labor from our men than they do is because the laborer here is fed better than he is in England; hence in these quotations to which you refer it is not man against man or management against management, so far as managers' ability may go to obtain work from his men, but it is merely the condition of things which Mr. Bell observed, and it does not appear that there is any exaggeration or misrepresentation in these statements, except perhaps in the one in which he says: "One-sixth more men for each furnace are required for producing less than one-half the quantity of iron." You must observe that in this remark he refers to the tabular statements given to him by

American friends. What section of the country they were from we cannot surmise, and what men he included as operating the blast furnace we are left in ignorance of. Take some of our furnaces handling stock from an area of acres. Every particle of it is shoveled on to the ground, then again into buggies, an average of 300 feet, to the hoist tower, a corps of engineers and boiler tenders for one blast furnace, and then running the cinder all over the cinder yard in little narrow streams, watering said cinder down, breaking it up, shoveling into carts, and then carting it off anywhere within a half-mile to a dump; such a furnace as this, I say, will employ three times the number of men that a well-arranged furnace in the Cleveland district regularly does, and I maintain that such a furnace was not an extreme rarity during Mr. Bell's visit to this country, nor is it the exception to-day. It is true that many furnaces have introduced better means of handling their stock, and others have provided themselves with cinder buggies of different types. It is, however, a very difficult thing to handle the stock preparatory to its introduction to the blast furnace in a really economical way in many localities of the United States, chiefly on account of long hauls of the fuel and the irregularity of supply requiring large stock, and our great ore mines of the lakes with their six months of winter. That much might be done to economize labor in the stock yards there is no question. Had Mr. Bell made his contrast between our average good furnaces and the average good furnaces of Great Britain, outside of the Cumberland and Cleveland districts, where the conditions were anything like approximating each other, we fancy he would have found no such disparagement as appears upon a cursory reading of the quotations from his work.

I am quite satisfied that the Scotch furnaces use man for man as many as we do in the production of their pig iron. I think there is no way of arriving at this question absolutely. It is really not a national one. Every district has its advantages, and the individual manager should take these into consideration; but his economy may not be wholly due to any merit of his—it may be largely natural advantages of locality. I would again state that there is a great deal of truth in Mr. Bell's statements, and that, therefore, they should receive the consideration of blast-furnace proprietors, that they may avail themselves of such contrivances as are used in the Cleveland district, and provide themselves, so far as possible, with the proper rolling stock and other railroad facilities, and thereby approach as near as their special locality will permit to the economy which has been obtained in the Cleveland district of England. Very respectfully yours,
FRED. W. GORDON.
PHILADELPHIA, Pa.

WASHINGTON NEWS.

(From Our Special Correspondent.)
WASHINGTON, D. C., May 19, 1885.
The "requested resignation" of Mr. H. B. James, for many years chief of the customs division in the office of the Secretary of the Treasury, was in the nature of a surprise, although it was not improbable that the opposition which had been raised against him from various sources would sooner or later culminate in a new appointment. The position is a difficult one to fill, on account of the influences at work on both sides, the dividing line between high and low duties constituting the great source of contention and discontent either way. Mr. J. G. Macgregor, of Minnesota, who has long been connected with this branch of the service, is acting chief. He is understood to be a Democrat in politics, but whether he will be assigned to permanent charge has not been decided. He is fully competent to perform the duties. Since Assistant-Secretary Fairchild has adopted the routine of referring all appeals in customs cases first to the Solicitor of the Treasury for opinions of law the duties of this division have been somewhat lessened in their scope.

LABOR AGENTS.
The appointments of special agents of the Labor Bureau which have been hanging fire for the past two months have at last been agreed upon and the names given to the public. It is claimed by the Secretary that these selections were made without reference to the political or economic views of the appointees. The general classification assigned the list is nine Democrats, five "Mugwumps" and three Republicans. Mr. Maubdy, of Ohio, was urged by the Knights of Labor, and Mr. Stinson, of New Hampshire, who is a Republican, is prominent in the labor organizations in that State. It is proposed to make three or four additional appointments for special assignment. It is the purpose of the chief of the Labor Bureau to have all this work finished and the reports in by October, so that he may be able to make his report in time for the meeting of Congress.

EUROPEAN GOODS IMPORTED FROM CANADA.

The attention of the Secretary of the Treasury having been called to the evasion of the customs duties of the United States by the importation from Canada of large quantities of goods manufactured in Europe, invoiced in Canada at the original European values, and which have been passed at our custom houses without any addition being made to raise the invoice prices to the market value of the goods in the markets of Canada, he has just issued an order defining the duties of customs officers in the premises. The Secretary says: "These goods were not destined for the United States at the time of their shipment from the European country of manufacture, but were imported into Canada for the purpose of being sold in that country either for consumption or for export to the United States, as circumstances might require. By reference to the regulations and Section 2906, Rev. Stat., it will be found that in such cases 'merchandise imported from one country, being the growth, production or manufacture of another country, will be appraised at the actual value in the principal markets of the country from which immediately imported,' &c. Collectors are instructed that in all cases where, in their opinion, the entered and appraised value of imported merchandise is too low,

it is their duty to order a reappraisal either by the principal appraisers or by three merchants, and to see that the questions involved, as above stated, are fully presented at the hearing."

AN AMENDATORY ARTICLE.

The Secretary of the Treasury has ordered that Article 857 of the General Regulations be amended so that it will apply to shipments of Canadian products and manufactures passing through the territory of the United States on through bills of lading, whether exported by vessels belonging to regularly established lines or not.

SHEET ZINC.

The Secretary of the Treasury has decided that certain so-called sheet zinc, commonly known as button material, which consists of a thin sheet of zinc coated or plated with nickel, and intended for use in the manufacture of buttons, is dutiable at the rate of 45 per cent. ad valorem, as a manufacture in part of zinc and nickel.

Depositing Nickel Upon Zinc.

Mr. H. B. Slater writes to the Electrical World describing a solution used by him for depositing nickel upon zinc, and giving the details of the procedure worked out by him. He refers to the matter in the following words:

The first sample of this solution was made as an experiment to see what substances could be added to a solution of the double sulphate of nickel and ammonium without spoiling it. In addition to several other combinations and mixtures of solutions from which I succeeded in obtaining a good deposit, I found that the solution here given would plate almost anything I put into it, and worked especially well upon zinc. In its use no "scrapping" or rescurring or any of the many operations which I have seen recommended for zinc need be resorted to, as the metal "strikes" at once and is deposited in a continuous adherent film of reguline metal, and can be laid on as heavily as nickel is deposited generally. I believe that the addition of the ammonium chloride simply reduces the resistance of the double sulphate solution, but the office of the potassium chloride is not so easily explained. At least, I have never been able to explain it satisfactorily to myself. It is certain, however, that the solution does not work as well without it, nor does the addition of ammonium chloride in its stead give as fine a result. Some care is necessary in the management of the current, which should have a density of about 17 amperes per square foot of surface—not much above or below. This may seem a high figure, especially when it is discovered that there is a considerable evolution of gas during the operation. I have repeatedly used this solution for coating articles of zinc, and always with good success. I have exhibited samples of zinc plated in this solution to those conversant with the deposition of nickel, and they have expressed surprise at the appearance of the work. Some strips of sheet zinc in my possession have been bent and cut into every conceivable shape without a sign of fracture or curling up at the edges of the nickel coating. The solution is composed of:

Double sulphate of nickel and ammonium, ounces.....	16
Ammonium chloride, ounces.....	4
Potassium chloride, ounces.....	4
Distilled water, gallon.....	1

The salts are dissolved in the water (hot), and the solution is worked at the ordinary temperature, about 16° C. The zinc may be cleansed in any suitable manner, but must be perfectly clean, of course, and finally rinsed in clean cold water and placed in the bath as quickly as possible, care being taken that it is connected before it touches the solution.

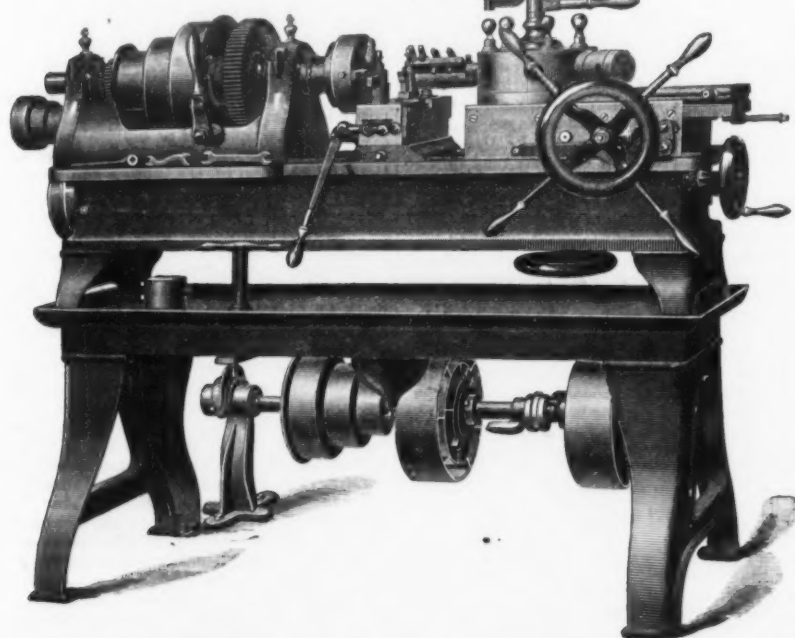
The investigation of the changes brought about in the dimensions of iron and steel rods has been a tempting field for investigation to a number of scientists. Among the latest contributors to the literature of that special line of experimental work is Mr. Shelford Bidwell, who has lately announced his results in a paper read before the British Royal Society. He finds that the length of an iron rod is increased by magnetism up to a certain critical value of the magnetizing force, and if that is passed the elongation is diminished in proportion as the magnetizing force increases. The amount of the maximum elongation appears to vary inversely as the square root of the diameter of the rod. In soft steel magnetization produces elongation, and with hard steel the critical value of the magnetizing force becomes very high. In soft steel a temporary elongation once produced may be maintained by a magnetizing force too small in itself to produce any elongation. Nickel continues to retract with magnetizing forces far exceeding those which produce the maximum elongation of iron. The greatest observed retraction of nickel is more than three times the maximum observed elongation of iron, and the limit has not yet been reached.

Phosphor ingot iron or steel, which is claimed to be practically free from silicon and low in carbon, has been patented by J. P. Witherow and H. W. Oliver, Jr., of Pittsburgh, Pa. In producing the iron the inventors employ a stationary converter, and charge it with, say, 3400 pounds of metal containing 1.8 per cent. of silicon and .55 of phosphorus. The charge is blown with a low-pressure blast, beginning at 7 pounds and then slowly reduced to 5 pounds. In five or six minutes the cinder will begin to flow from the cinder notch, and this flow continues from one to two minutes. The blow is continued, and then the metal is tapped off in a ladle and recarburized, if desired, by the addition of ferromanganese in the usual way. In this operation the charge is said to be practically desilicized, while the phosphorus remains in the metal.

The New York Central Iron Works (W. B. Dunning), Geneva, N. Y., are building an addition to their boiler works to meet the largely increased demand for the Dunning patent steam heating boilers. They state that more than 150 have been sold thus far this year.

Accidents in English Factories.

The report for 1884 of the chief inspector of factories and workshops, Mr. Alexander Redgrave, to the Home Secretary, was issued recently in England. It appears that by means now adopted and described in the report a very thorough knowledge is obtained of the causes of accidents in factories and the kind of machinery from which they arise. Mr. Redgrave states that more serious accidents occur in the factories which first come under inspection in 1867, those in which are found ponderous machinery and heavy materials, as, for instance, iron mills, machine makers, chemical works and the like. The less severe but more frequent occur in textile fabrics, cotton, worsted, woolen and flax factories. This, Mr. Superintendent Inspector Coles observes, ought not to be, seeing how well guarded in all respects machinery is now sent out by the makers. The truth is that nearly one-half of the accidents which take place arise from women and young persons cleaning the machinery when in motion. Children are prohibited from doing this by Section 9 of the Factory and Workshop act, and Inspector Coles suggests that this prohibition should be extended at least to all young persons under 18 years of age. A great number of accidents, too, are caused by the eagerness of the workpeople to finish their work, as, being on piecework, they are reluctant to lose any time by stopping the machinery. While the inspectors acknowledge that much has been done with the concurrence of the occupiers of factories to diminish preventable accidents by fencing dangerous machinery and other expedients,



Screw Machines Built by the Jones & Lamson Co., Windsor, Vt.—Fig. 1.—Nos. 8 and 9 Machine.

the chief inspector remarks that a similar spirit does not animate all employers. Strong objections are sometimes made to the adoption of simple precautions for the prevention of accidents, and nothing but severe measures can induce some employers, and even millwrights and machine makers, to acknowledge the necessity of greater precautions being taken. The report refers at some length to quarry accidents—many of which, it is remarked, might be obviated by greater care being taken—and those caused by shuttles flying from looms. It also deals with the question of securing a healthy atmosphere in factories and workshops, by rendering innocuous dust and gases evolved in the various processes of manufacture, and by prohibiting the overcrowding of work-rooms, and in this connection some information is given as to special forms of disease connected with particular occupations, such as wool-sorters' disease and the diseases of millers.

E. W. Harrison, one of the expert engineers appointed by the State of New Jersey to appraise railroad property in Hudson County, says the water front extends from the Palisades to Bergen Point, 70,000 lineal feet. Of this, 30,600 feet were in 1884 in the hands of the railroad companies. The New-Jersey Central owns 16,000 feet; the three canal companies, 1300 feet; the steamship companies, 1300 feet; the Hoboken Land and Improvement Company, 5300 feet; the Jersey Associates, 800 feet;



Fig. 2.—Samples of Work Done by No. 9 Machine.

the Standard Oil Company, 1100 feet, and other corporations, 9000 feet. Of the total stretch of 70,000 feet the northernmost 11,000 feet, next south of the Palisades, is of little value for harbor purposes. The Palisades trend so closely upon the river there as to leave no shore privilege, while the water is so deep that cribbing would be attended with vast expense. South of Castle Point, in Hoboken, to a point near Cavan Point, in Jersey City, are the valuable harbor fronts. The Central Railroad Company's front, Mr. Harrison says, is especially valuable, because there is a vast stretch of land under water above high-water mark that can be filled in and made into valuable railroad territory for comparatively little money. The West Shore acquired its ter-

minial at the rate of \$23,438 per acre. In Hoboken the North German Lloyd Steamship Company paid at the rate of \$64,000 per acre for its wharf privileges; the Hamburg Steamship Company at the rate of \$59,462 per acre, and the Bremen Steamship Company at the rate of \$55,000 per acre. The Morris and Essex paid in 1881 at the rate of \$50,385 per acre for property at the foot of Eighteenth street. The Pennsylvania Railroad Company paid \$73,613 per acre for a tract at the foot of First street, Jersey City; \$69,092 per acre for the tract at the foot of Morgan and Steuben streets, and more than \$100,000 per acre for water front at Morris and Essex streets. The total valuation of the Central Railroad's front as fixed by the State board is \$6,041,100.

Improved Screw Machines.

The accompanying engravings show some of the screw machines turned out by the Jones & Lamson Machine Company, of Windsor, Vt., together with samples of work done by them. As a matter of general interest, it may be well to state that the revolving-turret screw machine in its simplest form consists of a main bed, similar to a lathe bed with short legs, mounted on an iron table. The bed is furnished with a driving cone, spindle and chuck in a suitable headstock at the head, and a turret, turret-slide and slide-bed mounted together

The counter-shaft contains a driving cone and a pair of friction pulleys, one of which runs with a crossed belt in order to reverse the motion instantly. A stream of oil precedes the tools in their progress, and drains off through the table into a can below. Screw machines have long been made with turrets to be fed by hand; those with a simple lever are preferable for light work, those with star wheel and rack and pinion for heavy work. To lessen the labor in long or heavy milling, drilling, &c., and to enable the workmen to run more than one machine on such work, the Jones & Lamson Machine Company have designed an attachment for feeding the turret by power. It consists of a feed-shaft attached to the back of the bed, one end of which is geared or belted to the spindle, and the other end provided with a

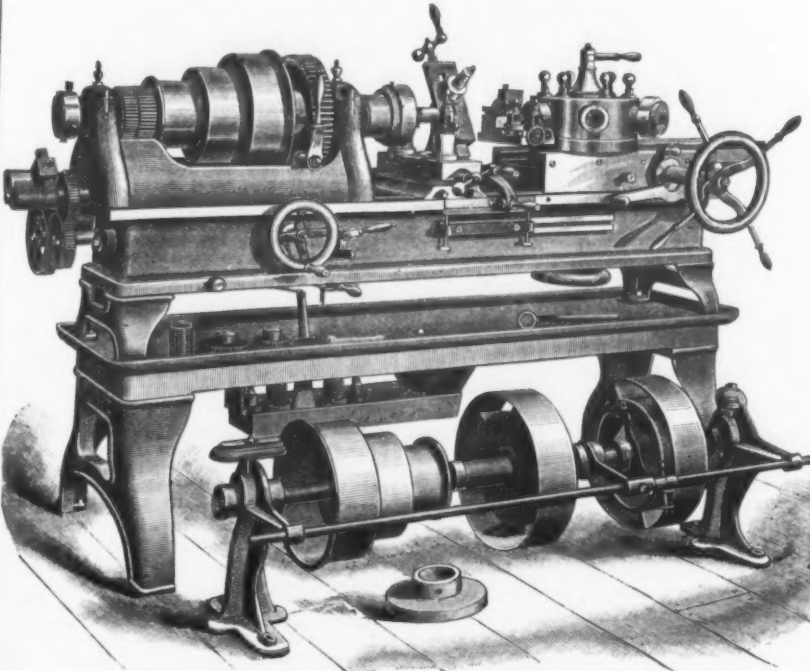


Fig. 3.—Nos. 10 and 11 Machine.

worm which, through a worm gear and a rack and pinion, feeds the turret as far as desired; an adjustable stop then disengages the feed by disconnecting the worm and worm gear. The feed may be stopped or started by turning a handle in front of the slide-bed. When the feed is disengaged the turret may be worked by hand, but the power-feed is found to do the work faster and better than the hand-feed.

Fig. 1 of our illustrations shows the Nos. 8 and 9 machines built by the Jones & Lamson Machine Company and designed for making large screws, studs, standing bolts and other work for locomotive and stationary engines from stock ranging in size as follows: No. 8, from 3/4 to 1 3/4 inches diameter; No. 9, from 7/8 to 1 1/2 inches diameter. The spindle is provided with back gears, which are applied by a clutch operated without stopping the machine. The great advantage of thus enabling the operator to change instantaneously from a high speed (used in turning) to a slow speed (required for cutting large screws with a die) and conversely will be recognized at once. The cut-off rest has their special appliances for operating the slide by either screw or lever. The slide has compound motions. The cut-off rest has longitudinal adjustment by means of a screw and hand-wheel. The turret-slide is provided

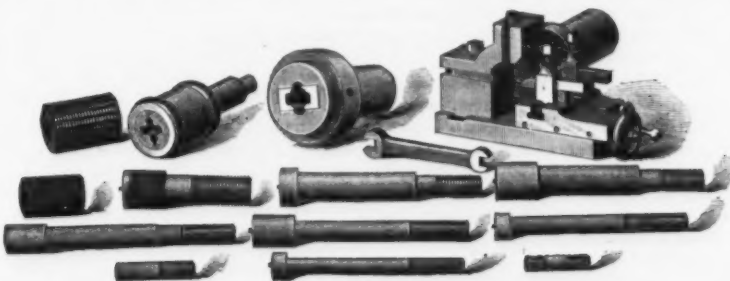


Fig. 4.—Small Tools and Samples of Work Done on Nos. 10 and 11 Machines.

with an automatic feed and an adjustable automatic stop for same. The turret has a binding clamp on top to hold it firm in doing heavy work. Each machine is provided with a counter-shaft with friction pulleys, a steel chuck, a face-plate, suitable wrenches, a box tool, die holder and stop gauge.

Fig. 3 shows the Nos. 10 and 11 machines designed for similar, though somewhat heavier, work, No. 10, for example, being for stock from 1 to 1 3/4 inches in diameter, and No. 11 for stock from 1 to 2 inches in diameter.

This illustration shows a chasing apparatus often used for cutting tapering screws, &c.

It also shows, in the basin under the table, a pump designed, in connection with a tank over the machine, for supplying oil to the cutters at work. The oil should be drawn to the work from the tank, through a pipe with a flexible end and a stop-cock; it afterwards drains from the table through a strainer into the pump basin and is returned by the pump to the tank by a suitable connecting-pipe.

Mr. Burnett Landreth, one of the vice-presidents of the American Exhibition to be held in London during the six months following the 1st of May, 1886, at the same time as the British Colonies Exhibition, urges manufacturers of American machinery to take advantage of that opportunity to display their improved appliances. Gen. C. B. Norton, of 7 Poultony, E. C., London, is secretary of the exhibition.

Mr. M. Jacker, of Florence, Wis., is at work perfecting the machinery for a process of rolling weldless chains. Rolls for a test with lead are being made at the North Chicago Rolling Mill.

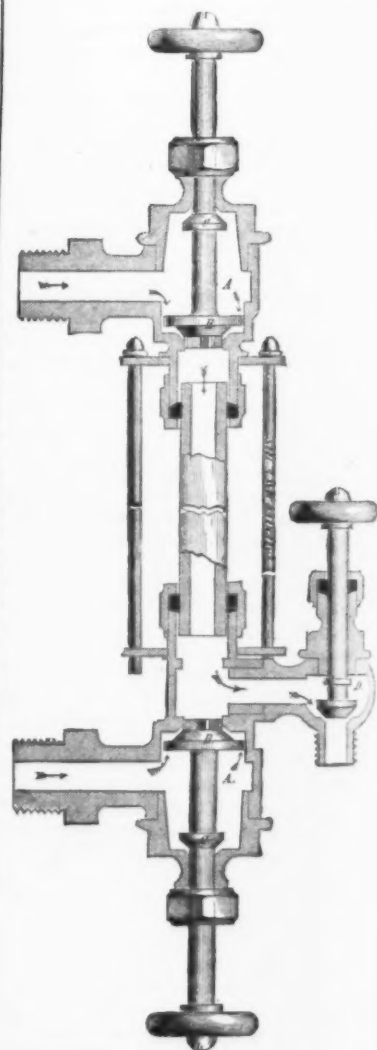
Benner's Prophecies.

Those who have pinned their faith as to the future ordering of events to Benner's Prophecies, as well as those who are skeptical of that gentleman's foreknowledge, will alike be interested in a pamphlet recently issued by Charles Himrod & Co., Detroit and Chicago, entitled "Is Benner a Prophet?" The substance of the pamphlet may be briefly summarized as a negative answer to the above question. The method adopted by the writer of refuting Benner is both simple and effective, and consists in showing that the argument in the "Prophecies" was founded on false premises, and that the conclusions conform to statistics existing only in the imagination of the prophet. It may be well to state that Messrs. Himrod & Co.,

ning in the colony, and we refused to take them. Well, this is what happened. We sent an order by telegraph to America for these engines, and such is the confidence we feel in the character of the material which will be supplied that we are prepared to take them without inspection there, while we cannot take the suspected ones from Great Britain." Sir Julius also made use of the following language: "I cannot help saying that under the free-trade system of Great Britain there has been a great deal of scamped work and adulteration going on, and that, buying in the cheapest market and supplying as cheaply as possible, manufacturers have been in the habit of not conscientiously supplying the best articles. It is only quite recently that by a happy accident—an iron axle falling to the ground and breaking while being unshipped—we were saved from sending forth death and destruction on our railways by using rotten axles sent out from Great Britain."

The Landerhohn & Nelson Self-Closing Boiler Water-Gauge.

With the object of overcoming the drawbacks and dangers incident to the sudden breaking of the ordinary steam-boiler water-gauges, Messrs. Lang & Smith, of 162 and 164 South Clinton street, Chicago, have brought out recently the Landerhohn & Nelson self-closing gauge. Its construction, as will be noticed, is simple. A A in the accompanying illustration are chambers in which valves and pistons, disks, B, move freely. The disks are 1/2 inch thick, their diameter being smaller than that of the chamber, so that the water and the steam can freely circulate in the glass. A stop in the valve stem prevents the disk from moving back more than 1/2 inch, so that it never can reach and impede the opening which con-



Self-Closing Boiler Water-Gauge.

nects with the boiler. The valves B are kept open when the water and steam are in the glass, because the area of C is smaller than that of B, the difference being about 1/4 of a square inch. As soon as the glass breaks, however, the full pressure of the boiler acts on the disks B, and the openings to the glass are instantaneously closed without letting water or steam escape. D is a blow-off valve with a sliding stem, the office of which is to prevent any dripping. The self-closing valve has been repeatedly tested with success.

Two iron boats, the Wyoming and Colorado, built for the Twenty-third Street Ferry, have arrived at this city from the yard of the Harlan & Hollingworth Company, Delaware. The hulls are built of iron plates, double riveted throughout. An extra iron plate 42 inches wide and 16 thick is put on at the water line over the regular hull plates, which are 5/8 inch thick, making 1 inch of iron at water line. The length of keel is 170 feet; length of deck, 182 feet; width of hull, 36 feet 6 inches; width over all, 62 feet 6 inches; depth amidships, 15 feet 6 inches. There are six water-tight compartments, with longitudinal bulkheads subdivided, forming 16 water-tight compartments. If the boat should be cut in two, each half, it is claimed, would float. The boiler is of the drop return flue pattern, 30 feet long and 10 feet 9 inches in diameter. The engine is of the latest design, and the cylinder is 46 inches in diameter and has a stroke of 10 feet, with Stevens's patent cut off. The galleys frame is built of iron.

The World's Exposition at New Orleans will be closed May 31. The friends of the exposition have raised \$95,000 by subscription to meet the expense of carrying it over until next November, when it will be reopened.

Index to Advertisements.

Carriage Envelopes and Wrappers.
Carr E. W. & Co., Chicago, Ill., 11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1

Trade Report.

New York Iron Market.

American Pig.—Business has remained very dull and quiet. Buyers are making efforts continually to wring concessions from the makers of standard brands of No. 2 Foundry and Gray Forge, without success. The former grade continues in full supply, but the mistake is occasionally made by purchasers in failing to recognize the difference between No. 2 X and No. 2. The latter is generally selling at \$16.50. The event of the week has been the advance in freights by the Georgia Central, which carries the Alabama and Tennessee Iron into this market. This advance averages about 50¢ per ton, and will tend to lessen the supply from that market materially, since there is no prospect of obtaining better prices here at present, while the very slight inducement to sell here is practically wiped out by the advance. We continue to quote standard brands of Lehigh and North River Irons, tidewater delivery, as follows: No. 1 X Foundry, \$18 @ \$19; No. 2 X Foundry, \$17 @ \$18; Gray Forge, \$16 @ \$17; the outside figure is asked for special brands. Outside brands sell for 50¢ @ \$1 less than our quotations.

Scotch Pig.—Business continues to be of a retail character. Nominal quotations for 5 and 10 ton lots are as follows: Coltness, \$21 to arrive; Gartsherrie, \$21 to arrive; Shotts, \$21 @ \$21.50 to arrive, \$22 from yard; Carnbroe and Glengarnock, \$19 @ \$19.50 to arrive; Summerlee, \$20 to arrive; Dalmellington, \$19 to arrive; Eglinton, \$18 to arrive; Clyde, \$19 to arrive. Concessions are made for larger lots and for sales from dock.

Bessemer Pig and Spiegeleisen.—We have not heard of any transactions in Foreign material, 20 % Spiegeleisen remaining nominally \$25.50 @ \$26, 10 % \$21.75, 45 % \$42 and 60 % \$52.50. Foreign Bessemer is, nominally, \$19 @ \$19.25, American Bessemer Pig is dull and unchanged.

Bar Iron.—Common continues dull and fairly steady. Refined, however, is lower, a state of affairs due to the pressure to sell on the part of weak concerns. Mild Steel is also entering as a factor to depress the market, selling below 2¢. We quote for delivery here, in round lots: Common Iron, 1.45¢ @ 1.55¢; and Refined Iron, 1.6¢ @ 1.9¢, the lower figure being occasionally shaded. Store prices are 1.55¢ @ 1.75¢ and 1.75¢ @ 1.9¢ respectively.

Structural and Shaped Iron.—There has been no improvement in the volume of business and prices remain stationary. Angles may be quoted nominally 1.9¢ @ 2.2¢, delivered, for round lots, and Tees at 2.2¢ @ 2.25¢. Store quotations remain 2.2¢ @ 2.4¢ for Angles, and 2.5¢ for Tees. American Beams and Channels are 3¢ from dock for all orders. Foreign Beams, in round lots, are quoted 2.5¢ @ 2.6¢ for Belgian, and 2.6¢ @ 2.8¢ for German.

Plates.—Owing to heavy orders Steel Plates have advanced in Scotland and England. Business here is very quiet. Usual prices of Iron Plates are as follows: Common or Tank, 2¢; Refined, 2 1/4¢ @ 2 1/2¢; Shell, 2 1/2¢ @ 2 3/4¢; Flange, 3 1/4¢ @ 3 1/2¢; Extra Flange, 4¢ @ 4 1/4¢. For small lots of Steel Plates the quotations are as follows: Ship, 3¢ on dock; Tank, 2 1/4¢ @ 3¢ on dock; Boiler, 3 1/4¢ @ 3 1/2¢ for Shell, 3 1/2¢ @ 4 1/4¢ for Flange and 4 1/4¢ @ 5 1/2¢ for Extra Flange and Fire-Box. Round lots Open-Hearth Steel Bridge Plates, 2 1/2¢, cut to specification.

Sheet Iron.—The market is quiet and dull, with quotations unchanged.

Steel Rails.—About 5000 tons have been placed for Western delivery. The Eastern mills have done very little, and the market continues dull. We quote, nominally, \$27. The Scranton Steel Company are still idle, on account of the lockout, while the North Chicago Rolling Mill Company's strike is reported ended. Some of the mills are well supplied with orders till late in the summer; others have still considerable idle capacity.

Steel Wire Rods.—About 1000 tons of Rods for early delivery have been closed at private terms. There is, however, considerable spot stock still, and quotations remain at \$39 @ \$40. We are informed that we were in error when we stated that the difference in favor of No. 6 was 75¢ @ \$1, as we noted last week. It is stated that it is in reality \$1.50.

Steel Blooms.—Imported Soft Steel Blooms, 6 x 6 inches, are quoted \$32 @ \$35.

Old Rails.—There has been very little doing, the market remaining nominally \$16.50.

Scrap.—The market has been very dull. We quote nominally, \$18.50 @ \$19 from yard.

Rail Fastenings.—Quotations for large lots are 2.6¢ @ 2.65¢ for Bolts and Square Nuts; 2.75¢ @ 3¢ for Bolts and Hexagon Nuts, and 1.6¢ @ 1.7¢ for Splice Bars. Railroad Spikes are quoted 1.8¢ @ 1.9¢.

Steel Crop Ends.—We note a sale of 400 tons of English Crop Ends, at private terms. We quote, nominally, \$19.

Philadelphia.

Office of The Iron Age, 280 South Fourth St., Philadelphia, May 19, 1885.

Pig Iron.—The market shows continued dullness, and while there is no quotable change in prices, the feeling is easy, and in

some cases may be called slightly lower. There is very little demand, however, so that the market is to some extent an untended one, as no one seems inclined to make offers for large lots. Holders are almost equally indifferent, and while they are all anxious to effect sales, there is no general disposition to force business for the reason, probably, that such attempts would not be likely to increase sales to any extent, but would be almost sure to affect prices. Those who need Pig Iron, and especially if they confine themselves to certain brands, cannot shade prices more than 25¢ @ 50¢ per ton, while those who are not in need could hardly be induced to buy at any price. Sales, therefore, have been chiefly in small lots for immediate delivery at from \$15.50 to \$16, delivered, for Mill Irons, \$16 @ \$16.50 for No. 2 Foundry and \$17.50 @ \$18 for No. 1. As to the outlook there is nothing to indicate any immediate change either for better or worse. The supply of good brands is not excessive, and anything like a fair demand would soon develop a serious scarcity; but, in view of the meagerness of consumption, there is no anxiety on that score. It should be remembered, however, that prices are now very near to the lowest figures in the history of the trade, and No. 1 Foundry at \$17.50 is actually below the average of the lowest year on record. The average during 1878 was \$17.62 1/2, and the lowest average for any three months was \$16.87 1/2. It is hardly necessary to say that at that time the outlook was just as gloomy as it is to-day. Prices had been on the down grade for more than five years. At \$17 there was a pause, and from that date (the close of 1878) to the middle of February, 1880, there was a steady advance until \$43 was reached. Then the return wave set in, and from that date, more than five years, prices have been gradually seeking a lower level. This is a remarkable coincidence, to say the least, and is there any reason why it should cease at this point? Prices, as already stated, are below the average of the lowest year on record, and very near to the lowest point in the lowest year. There is nothing in sight to warrant predictions of better times now, but there was nothing to warrant it in 1878, else why were prices so low? One thing appears to be absolutely certain, and that is that prices cannot go much lower; and another is extremely probable, and that is that when bottom is once touched the reaction will be very rapid.

Foreign Iron.—Negotiations have been in progress for some time on both Spiegel and Bessemer, but buyers' ideas are so low that there is but little chance of them being met. Bessemer is offered at \$19, and 20 % Spiegel at \$25.50, and with lower freights these figures may be shaded a trifle, providing it would be likely to lead to business.

Muck Bars.—There is not much demand, but prices are steady and unchanged at from \$26.50 to \$27.50, delivered, according to quantity, quality, &c.

Blooms.—Business is unusually quiet, but small sales are occasionally made at quotations about as follows: Soft Basic Blooms at from \$33.50 to \$35, Billets from \$38 to \$39, and Siemens-Martin at from \$40 to \$42. Domestic Blooms are quoted at from \$30.50 to \$32, delivered, for Nail Plate, and \$35 @ \$36 for Plate and Sheet Blooms. Other descriptions are dull and prices nominal, as follows: Charcoal Blooms at \$50 @ \$52; Run-out Anthracite, \$43 @ \$44; Scrap Blooms, \$34 @ \$35; Northern Ore Blooms, \$34.

Bar Iron.—There is a good demand for small lots, but nothing beyond that. Still the mills are kept fully employed, but on a class of work that may stop at any time. One of the proprietors of a leading mill states that, while they have been running full for several weeks, there has been no time for months past when orders on their books would be sufficient to run them an entire week, so that orders coming in from day to day are all they have to depend upon. This applies to almost every mill and to every department. Prices have been at bottom so long that there is really no possibility of anything lower, but so far there are no indications of improvement. Sales are made at all sorts of figures, according to quality, quantity, specification of sizes, &c., with 1.5¢ at bottom for Common Iron, and from that up to 1.75¢ @ 1.8¢ for Best Refined.

Plate and Tank Iron.—The market cannot be called very active, but there is some improvement compared with several weeks immediately preceding. Orders are for small lots, however, and there is nothing to indicate any general change in the position. Prices are about as last quoted, with some disposition to shade on good-sized lots, viz.: Ordinary Plate, 2¢; Tank, 2¢ @ 2.1¢; Shell, 2.5¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Flange, 3.5¢ @ 3.75¢; Fire-Box, 4¢ @ 4.25¢.

Structural Iron.—The demand has been exceedingly small of late, but the mills have been kept at work on old orders. These are now pretty well exhausted, and the prospect for new orders not very encouraging, although there are some inquiries on the market which may result in business in the course of a week or two. Prices about as quoted last week, viz.: 2¢ @ 2.1¢, delivered, for Angles, 2.1¢ @ 2.15¢ for Bridge Plate, 2.3¢ @ 2.4¢ for Tees, and 3¢ for Beams and Channels.

Sheet Iron.—The demand is fair, although not quite what manufacturers would

like to see at this season. Prices are steady and usually quoted about as follows:

Best Refined, Nos. 26, 27 and 28..... 3 1/2¢
Best Refined, Nos. 18 to 25..... 3 1/4¢
Common, 1/4¢ less than the above.
Best Bloom Sheets, Nos. 26 to 28..... 4 1/2¢
Best Bloom Sheets, Nos. 22 to 25..... 4 1/4¢
Best Bloom Sheets, Nos. 16 to 21..... 4 ¢
Blue Annealed..... 2 1/2¢
Best Bloom, Galvanized, discount..... 60 ¢
Second quality, discount..... 60 ¢
Common, discount..... 60 ¢

Wrought-Iron Pipe.—During the week a fair amount of business has been transacted, and the feeling in regard to the future continues hopeful. A considerable number of inquiries has been on the market during the past 10 or 15 days, and a satisfactory proportion of these has already resulted in business. There appears to be more uniformity in quotations than has been the case for some time past, and it is said that manufacturers are endeavoring to get rid of much of the irregularity which has characterized the market for some months past. There is no change in quotations except that Lap-Welded Black Pipe is now quoted at 65 @ 65 and 5 ¢. The other articles of the list remain at the following discounts: Butt-Welded Black Pipe, 45 @ 47 1/2 ¢; Butt-Welded Galvanized, 35 @ 37 1/2 ¢; Lap Welded Galvanized, 45 @ 47 1/2 ¢; Boiler Tubes, 57 1/2 @ 60 ¢.

Nails.—There is little activity to report, and at the moment the Nail market generally wears a quiet aspect. There are some Nails selling, but the demand is not as great as is usual at this season of the year. Nails in first hands are claimed to be steady, but a certain amount of irregularity is perceptible. Iron Nails are nominally \$2.30, and Steel at \$2.45 for ordinary sized lots.

Steel Rails.—There is very little change, price and demand being about as last reported. There is a moderate business doing, chiefly in small lots, although there are inquiries from large buyers who would probably place orders at \$26 or a little over that. Manufacturers are firm at from \$27 to \$27.50 at mill, and, so far as known, nothing has been done at less than \$27. There is a good demand for Light Rails, and, on the whole, the market may be called steady to firm.

Old Rails.—There is nothing doing except in very small lots. Buyers would pay \$17 @ \$17.25, Philadelphia, for good-sized lots, but there are very few that can come here at less than \$17.50 @ \$17.75, unless holders modify their ideas. Meanwhile, both sides refuse to make concessions, so that prices are nominal as above mentioned. Interior deliveries command \$18 @ \$18.50, and can only be had in limited quantities at those figures, some holders asking \$19 and upward.

Scrap Iron.—Extremely dull, and with larger offerings prices are easier, and may be quoted as follows: No. 1 Wrought Scrap, \$17.50 @ \$18; No. 2 do., \$12 @ \$13; Horse Shoes, \$22 @ \$23; Turnings, \$13 @ \$14; Old Car Wheels, \$15.50 @ \$16; Old Steel Rails, \$15.50 @ \$16; Fish Plates, \$22.50 @ \$23; Cast Scrap, \$13.50 @ \$14; do. Turnings, \$9 @ \$10.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, Pittsburgh, Pa., May 19, 1885.

But little change to note in the general business situation; there has certainly been no improvement during the past week. The conference committees of iron manufacturers and ironworkers, in regard to the wage scale for the coming year are apparently no nearer together than they were a week ago. The latter say they will not accede to the proposition of the manufacturers; hence a strike next month is probable. The manufacturers, as a rule, are determined, and so are the workers. Of course a compromise is not improbable. There are several very objectionable features from the workmen's standpoint in the proposition made by the manufacturers, one of the most important being the clause giving the manufacturers the right to ask for a further reduction on giving 60 days' notice. Heretofore the custom has been to fix the scale for a year, and this custom the men are anxious to have continued. The conference committees have had no meetings since the first one, which was of very brief duration, and the probability is that there will be nothing definite accomplished before the last day of the month, if there is then, as both committees will be for holding back until the last minute, the one hoping and expecting the other to make some concession. Most of the manufacturers are in good shape for a shut down, and it is pretty evident that unless a liberal concession from the present wage scale is offered by the Amalgamated Association the mills will be closed.

Iron Ore.—This important interest continues in a very depressed condition, and the outlook is not encouraging for any immediate change for the better. The consumption at the present time in this vicinity is less than it has been for a number of years.

Pig Iron.—But little change in the situation during the week under review. Furnacemen and brokers continue to report business as being as dull as it can be without stopping altogether, and there is not likely to be any improvement until the wage scale has been settled. If there should be a shut-down next month it is probable that most of the furnaces in blast will blow out, as there would be no inducement to pile up. Even now the production is in excess of the consumption, and, with the large amount of hypotheated iron in the hands of banks and insurance companies, the market is in anything but a promising condition. The general position of the market here never was worse for producers. If the wage scale

should be adjusted without a strike, there will no doubt be an improved demand for a time, as consumers, with a strike in view, have bought but sparingly for some time past, and are very low in stock in consequence. We quote prices as follows:

No. 1 Neutral Forge..... \$15.50 @ \$15.75, 4 mos.
No. 2 Neutral Forge..... 14.50 @ 15.00, 4 ¢
Mixed lots Forge..... 13.50 @ 14.00, 4 ¢
All-Ore Forge..... 16.00 @ 16.50, 4 ¢
White and Mottled..... 13.50 @ 14.00, 4 ¢
No. 1 Foundry..... 17.00 @ 18.00, 4 ¢
No. 2 Foundry..... 15.50 @ 16.50, 4 ¢
No. 1 Foundry, Charcoal..... 23.00 @ 23.50, 4 ¢
No. 2 Foundry, Charcoal..... 20.00 @ 21.00, 4 ¢
Cold-Blast Charcoal..... 25.00 @ 27.00, 4 ¢

Included in the sales reported were No. 1 Neutral Forge at \$15.25, cash, and Bessemer Iron at \$17.25, cash, to \$18, four months.

Muck Bar.—Continues as dull as ever, and in the absence of sales may be quoted at \$26 @ \$27, cash, according to quality.

Manufactured Iron.—There has been little or no change in the situation during the week. May is usually a good month, but thus far it has been an exception. Possibly a shut-down might not suit some of our manufacturers, but the majority of them never were in better condition for it than at present, and a suspension of production for 60 or 90 days would stiffen the market for all kinds of finished goods. For first-quality iron prices are still quoted on a basis of 1 65¢ @ 1.75¢ for Bars, 60 days, 2 ¢ off for cash.

Nails.—The Nail trade continues dull, but it is hoped that there will be an improved demand later on. Prices are weak, but without quotable change. Iron Nails in car lots, \$2, 60 days, 2 ¢ off for cash; Steel Nails, \$2.05. Some jobbers, it is said, refuse to pay more for Steel than for Iron. It is very evident that if makers of Steel Nails desire to supplant Iron Nails with their product they will have to keep the price of the former down pretty close to that of the latter. The next meeting of the Western Nail Association takes place at Cincinnati on the 27th inst.

Wrought-Iron Pipe.—Trade is picking up a little, but it continues far below what it should be at this season of the year. Prices remain unchanged; they are so low that there is no room for any further cut. Discounts on Black Butt-Welded, 1 1/4-inch and smaller sizes, 50 ¢; on Galvanized do., 40 ¢; on Black Lap-Welded, 1 1/2-inch and larger sizes, 67 1/2 ¢; Galvanized do., 50 ¢. On selected Pipe, or Pipe cut to specified lengths, the discount is 5 ¢ less than the rates above quoted. Discount on Boiler Tubes, 60 ¢; 2-inch Oil-well Tubing, 10¢ per foot, net; 5 1/2-inch Oil-well Tubing, 36¢ per foot, net.

Steel.—Best brands of Refined Cast Steel remain unchanged at 8 1/2¢; do. Crucible Machinery, 4 1/4¢; Open-hearth and Bessemer do., 3¢. Those mills making a specialty of Nail Slabs still have about all they can do, and are quoted steady at \$29.50 @ \$30 per ton, delivered.

Old Rails.—With a diminished demand and increased offerings we have to report a weaker market for Old Iron Rails, prices having gone off at least 50¢ per ton, and consumers are confident of a further decline; we are reported a sale of 1000 tons at \$19, against sales a week ago at \$19.50. Old Steel Rails also weak and less active. We reduce our quotations to \$16.50 @ \$17.50, according to length. The mills about Youngstown, the largest buyers of Iron Rails for some time past, are reported as pretty well stocked and out of the market for the present.

Steel Rails.—Owing to the largely reduced production elsewhere there is an increased demand here, and we are reported sales in different lots of 17,000 tons at \$27 @ \$27.50, cash, at mill. However, while there is an increased demand and the market is firmer, there is no bonanza to makers at present prices, which do little more than cover cost.

Railway Track Supplies.—There is possibly a little more inquiry, but business continues very dull for the season. Prices remain about as last quoted: Spikes, 1.85¢ @ 1.9¢, delivered; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2.55¢ @ 2.65¢ with Square and 2.75¢ @ 2.85¢ with Hexagon Nuts.

Crop Ends.—New Steel Rail Ends continue in small supply, and with considerable inquiry for small lots for immediate delivery prices may be quoted steady at \$18.75 @ \$19; Steel Bloom Ends, \$18 @ \$18.50.

Scrap.—The market continues very dull and prices are weak, but without quotable change. No. 1 Wrought, \$17 @ \$18, net; 1/2 ton, outside figure for selected; Wrought Turnings, \$13 @ \$14; Old Car Axles, \$24 @ \$25; Cast Borings, \$11 @ \$12, gross ton; Old Car Wheels, \$16 @ \$17, gross ton.

Coke.—The general situation remains unchanged; business continues light, with but little prospect of any immediate improvement. Blast Furnace Coke remains unchanged at \$1.20 per ton, free on cars at ovens. Freight from ovens to Pittsburgh, 80¢ per ton.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., Chicago, May 18, 1885.

Hardware.—The demand for the week was somewhat better than for the week previous. Jobbers report quite an increase in orders. All orders, however, are small, and it requires a great number of them to make an active market. Salesmen complain that they cannot induce buyers to anticipate their wants to any extent. Retail merchants at the moment are buying only such goods as they can find an immediate market for. The

system of buying is criticised as being more conservative than their stocks on hand would warrant and not consistent with the low prices at which goods can be had. Collections have also improved since the first of the month, which jobbers accept as an indication that consumption will go on more freely, that more money is in circulation among the farmers, and that with these points in his favor fair prices and a steady market will continue to rule.

Barb Wire.—The principal feature in this market for the week was the decision of Judge Brewer in the United States Circuit Court at Des Moines, sustaining the Glidden patents on Barb Wire and the Putnam patent on a machine for making the same. It is claimed that this decision virtually prohibits the further manufacture of unlicensed Wire, and makes the former manufacturers liable to a suit for damages by the Washburn & Moen Company. Since the day the case was terminated the market has been weak, more particularly on unlicensed Wire. Makers of Wire who had stocks on hand have been casting about for buyers at almost any figure, and the exact cause not being generally known, by their action the market was badly distracted. Later in the week it was scarcely possible to obtain an offer on "moonshine" Wire in this vicinity, but the tempting price at which it was offered had a strong influence on sellers of licensed Wire, and in more than one case it is supposed that concessions had to be made to save their trade. This depression in price is regarded as only temporary, as the opinion prevails that the withdrawal of 25 % of the product which was unlicensed will cause a reaction in demand and a general stiffening of prices. There has been very little Wire sold, except in small lots, which we quote at 3 1/4¢ for Four-Point Painted Cattle Wire, 3 1/4¢ for Four-Point Hog Wire and Two-Point Cattle Wire, 3 1/4¢ for Two-Point Hog Wire, with 1¢ added for Galvanized, and 1/2¢ off in carload lots. While these prices are being shaded frequently, there are no sellers who are willing to make open quotations at lower figures.

Nails.—The market is so badly demoralized that there is great difficulty in getting at the true situation. For reasons not made public, makers are shoving Iron Nails into the market at astonishingly low figures. The jobber loses no time in disposing of the stock by meeting the decline as fast as necessary, each house selling independently. Carload orders are accepted at \$2.10, 2 ¢, 60 days, and smaller lots at \$2.15, and a fair demand reported for lots in less than carload. These figures are nearly the same as those of a week ago, but are less firmly adhered to, with strong indications that there is considerable weakness. Steel Nails are fairly well sustained at \$2.25 in large and small lots. Stocks of Steel Nails would be entirely inadequate to meet the demand if it were not for the difference in price, which changes the consumer's mind in many cases.

American Pig Iron.—Transactions for the week have been exceedingly light; carload buying still has preference, and no sales of over 100 tons to one purchaser are announced. It would appear that inquiries for large lots have ceased. The apathy of the market during the past week is in part attributed to the possibility of a labor strike on the 1st prox. Whatever the cause, the market has certainly been more quiet than the week previous. On such sales as were made sales agents report that prices were fairly well sustained, and that no new concessions were necessary to hold their customers. Business is done under such diversified circumstances that there scarcely exists a regular market value. There are furnaces making Charcoal Iron who will not sell at all at prevailing prices, while there are others who will sell for immediate delivery only. Then there are others who are willing to sell for delivery any time within six months, or perhaps a year, and another class who appear always ready to meet as much of the buyer's demand as will secure them the order. It is therefore difficult to get at the exact selling figure, and we make the following quotations on carload lots, four months, as representing standard brands: Lake Superior Charcoal, Nos. 1, 2 and 3, \$19.50 @ \$20; 4, 5 and 6, \$21 @ \$22; Lake Superior Coke, All Ore, \$19; Cinder Mixed, \$17 @ \$18; Ohio Standard Black Band, \$18.50 @ \$19; Southern No. 2, \$17; No. 3, \$15; Mill Iron, \$14.50 @ \$15. One lot of less than 100 tons of Southern Iron was to have been placed at \$17, cash, and several other small lots of doubtful quality ranging from \$16 to \$16.50.

Scotch Iron.—There is no call of consequence for Scotch Iron and very little interest manifested in the condition of stock or coming supply. We quote Glengarnock \$24, and Summerlee \$25, ex-ship.

Merchant Steel.—There has been some improvement in the demand during the past week for Tool Steel of the finer grade from the extreme Western territory. It would seem that the probabilities of a strike among rolling mills about June 1 has revived buying to some extent—likely to provide against emergencies. We quote prices on Tool Steel ranging from 7 1/2¢ to 9¢ to buyers of small lots from store.

Steel Rails.—The market for Steel Rails is decidedly flat. There appears to be even less inclination to buy in this market than several weeks ago. The strike at the North Chicago Rolling Mill ended on Thursday of last week, and the mills started up this

morning. The men have returned to work on precisely the same conditions as they went out. After having again established themselves at work the strikers will wait on the company, through a committee, to report their grievances, which will be considered within the regular two weeks' notice which employees are required to give. Should their case demand concessions from the company, they will endeavor to come to terms. Work on the alterations of the Joliet mill are being pushed vigorously. In other respects producers are in the same position as they have been for some months, and Ralls continue to be quoted at \$29 for Heavy and \$35 for Light Sections.

Old Ralls.—Stocks are reported more plentiful, with less demand. This situation, however, does not weaken prices, which are quoted at \$17.50, Chicago delivery, and \$17, Milwaukee; \$18 is asked by holders of Old Iron Ralls, but none have changed hands at this figure during the week, so far as heard of. Steel Ralls are quoted at \$13.50 @ \$14, 50¢ @ \$1 1/2 ton higher than the week previous. There has been some demand for Straight Long Sections at this figure which has not been filled. Straight Short Ralls are quoted \$12.50 @ \$13, prices being well supported in both cases.

Bar Iron.—The demand for the week has been very moderate. No orders of any importance have been placed, and trade has been largely for direct consumption and sorting up stocks in the country. Railroads continue to buy just as they need it, and no more. New Puddled Iron is pretty firmly sustained at 1.8¢ rates from store, while Common Iron is weak at 1.7¢. Orders for stocks not on hand are booked subject to strikes and blockouts, as well as quotations for anything beyond immediate delivery. Jobbers are of the opinion that there will be a better demand in the next two weeks, as there are strong indications that a strike will occur. Many buyers have been making inquiries for lots for delivery after this date, while some are increasing their orders beyond their immediate wants.

Structural Iron.—Nothing of importance has occurred in the Structural Iron market. No large contracts have been placed, and the demand consists entirely of material suitable for small buildings. We make the following quotations: Beams and Channels, \$3.10; T-Iron, \$3; Angle Iron, \$2.50; Flitch Plates, \$2.50; Frieze Plates, \$2.70; 1/4¢ @ 1/2¢ is added for delivery from stock.

Galvanized Iron.—The situation of the Galvanized-Iron market is very much as it has been the past two months. Jobbers continue to quote Juniata, discount 60%; Charcoal, 60 and 5%; Refined, 60 and 10% from store. While these prices are considered regular to the general trade, there is doubtless an extra 5¢ given to buyers of quantities ranging from 50 to 100 bundles. Several manufacturers of well-known brands have announced their withdrawal from the market, because they were not willing to meet prices which were made in inferior qualities.

Old Wheels.—The market, if anything, for Old Wheels has been a trifle weaker, though lots of from 50 to 100 tons are quoted at from \$14.50 to \$15. A lot of 100 tons during the week was offered at \$14, and not sold. It is said, however, that the same Wheels in small quantities would have commanded 50¢ @ \$1 1/2 ton more on the same conditions of payment.

Scrap Iron.—There is considerable activity among Scrap-Iron dealers, as stocks are coming in very lively. We quote No. 1 Mill, \$14; No. 2 at \$9, and an abundance of both grades offering. No. 1 Forge is quoted \$17.50 @ \$18, but needs to be very closely graded. We make the following quotations as dealers' purchasing price: No. 1 Wrought Scrap, 1/2 net ton, \$14 @ \$15; Cast Scrap, 1/2 net ton, \$12; No. 1 Stove-Plate Scrap, 1/2 net ton, \$8.50 @ \$9; Wrought Turnings, 1/2 net ton, \$9 @ \$9.50; Cast-Iron Borings, \$7; Old Plow Steel, \$8; Tool Steel, 1/2 ton, \$14.50; Locomotive Steel Tire, 1/2 net ton, \$16; Buggy Springs, 1/2 net ton, \$14; Mal-leable Scrap, \$6.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., Chattanooga, Ga., May 18, 1885.

General business is dull, yet there are many things that are of an encouraging nature, and merchants and manufacturers are looking hopefully to the future. Business generally for the present year has been considerably in excess of the corresponding period of last year. The anticipated strike of the ironworkers of the North on the first of June has, of course, a very discouraging appearance. The principal product of many of our furnaces being Forge Irons, it will close to them a large source of demand. Most of our manufacturers are running full, and orders are presenting themselves that insure full time for several months to come. There is some talk among the railroads of advancing freights on Pig Iron, but this will hardly be done so long as the present condition of affairs lasts. The furnaces that went out a few weeks since for repairs are being thoroughly overhauled, and most of them will be in blast during the coming month.

Pig Iron.—The movements in this article have been about as usual. Some of the Northern consumers have closed contracts for about 9000 tons during the past week, and, while some of the furnaces who have plenty of money are putting some of their output in store, most of them are selling close up to the hot-bed.

Hardware.—Our merchants are a little surprised at the continued good trade, considering the time of the year, when trade of all kinds drops off into the dull season. Building Hardware continues active, and will probably remain so during the season. The sale of Shelf Goods is limited to supplying the actual wants of the country stores who simply buy from hand to mouth.

Cast Pipe.—Orders for Pipe for water and gas purposes continue to be received, and the ability of the works to meet the demand is taxed to the utmost. Inquiries are being received from nearly every section of the Union, and where favorable rates of freights can be obtained little difficulty is being experienced in closing contracts.

Railroad Fastenings.—There has been some increased demand for these articles, but the works are fully able to meet the wants of the roads.

Miscellaneous.—Scrap in nearly all lines is but nominal, although there has been some Old Wheels sold at \$12.50, 60 days. Some holders are asking more, but with little prospect of selling. Sales of Cotton Tie Clippings have been made at 50¢ for Loose and 55¢ for Baled. The marble works have been running full since they were first put in operation; they are now shipping their products, polished and finished complete, into nearly every State of the Union. Their output consists of center-table tops, mantels, escrtoire stands, both white and variegated varieties.

Cincinnati.

MAY 18, 1885.—**Pig Iron.**—The business in the past week has been confined to retail trade. Car lots are the rule. Reports continue to come in from consumers in all quarters that no considerable orders are coming, and none promised in the near future. Quotations for delivery on cars here, four months; 50¢ 1/2 ton less for cash. Deliveries on cars at furnaces less the freight to Cincinnati.

CHARCOAL FOUNDRY.
Hanging Rock, No. 1.....\$21.00 @ \$21.50
Tennessee, Alabama and Georgia,
No. 1.....18.00 @ 18.50
No. 2, \$1 less.

COKE FOUNDRY.
Ohio and Pennsylvania, No. 1.....18.00 @ 18.50
Virginia, Tennessee and Alabama,
No. 1.....15.50 @ 17.00
No. 2, \$1 less.

SILVER-GRAY SOFTENERS.
Hanging Rock, No. 1.....17.50 @ 18.00
No. B. 1.....16.50 @ 17.00
Hanging Rock, No. 2.....16.00 @ 16.50
Hanging Rock, No. 3.....15.50 @ 16.00
Other makes for the range of
grades.....14.00 @ 15.75

CAR WHEELS.
Hanging Rock, Cold Blast Charcoal
Standard Tennessee, Alabama and
Georgia Warm Blast.....24.00 @ 25.00
Other Warm Blast makes.....20.00 @ 21.00
No sales of Forge Pig or Scrap Iron reported.

Louisville.

W. B. BELKNAP & Co., Louisville, under date of May 18, 1885, report as follows: The all-absorbing topic now, as it has been for several years past just at this season, is the June strike. Associated Press dispatches and individual circulars are utilized to fan if possible the buyer's doubt into a flame of apprehension. The effort is not as successful as usual this year, owing to a widespread belief that the strength of the Amalgamated Association was seriously impaired, and that, as year by year the manufacturers' interests become more and more specialized, so it is the more difficult to obtain united action. On the other hand, there is the feeling of desperation on the part of manufacturers over the course of prices during the last year, and the men themselves argue that they would have no more steady work at the reduced rate than at the present; so both mills and men apparently desire a stop. Bars are somewhat more active, as they always are when the mills retire from the contest for orders and refuse to book ahead. There is a slight stiffening incident to the new demand. Hoops and Sheets are quiet. Nails are again much depressed—so much so, indeed, that another reaction is not improbable. Steel Nails, owing to limited supply, have held their own with wonderful firmness. The closing down of Bellaire will go to help this. Wire.—Demand is fair for both Plain and Barbed, but there is little new to report. General trade is improving slightly as the country begins to realize some cash from the early fruit crop.

GEORGE H. HULL & Co., of Louisville, report to us as follows, under date of May 18, 1885: In the absence of speculative inquiry this week the market remains about as it was two weeks since, except that there is a firmer feeling in consequence of the knowledge that furnaces will not sell large lots for future delivery. There have been some moderate sized lots sold to consumers, running for three to six months ahead. For standard grades the quotations have been fully maintained. Some concessions have been made on clearance sales of irregular grades for immediate delivery and prompt cash. May and June are usually dull months, and there is nothing to indicate that they will be otherwise this season. If, instead of this, we were just entering on the usually active months of July and August, we should expect to see an immediate improvement in prices, as it is quite evident that furnaces are not disposed to sell large amounts for future delivery. There is some considerable stock at furnaces of Nos. 2 and 2 1/2 Foundry, against a very small stock of No. 1 Foundry, and no stock at all of Nos. 1 and 2 Mill Irons.

PIG IRON.
Southern Coke, No. 1 Foundry.....\$16.50 @ 17.00
No. 2.....15.50 @ 16.00
Hanging Rock Coke, No. 1 Foundry.....16.00 @ 16.50
Hanging Rock Charcoal, No. 1 Foundry.....21.00 @ 21.50
Southern Charcoal, No. 1 Foundry.....18.00 @ 18.50
Silver Gray, different grades.....14.00 @ 15.30

Southern Coke, No. 1 Mill, Neutral. 13.75 @ 14.35
No. 2 " " Cold-sh't. 13.25 @ 13.50
White and Mottled, different grades 16.00 @ 17.50
Southern Car-Wheel, standard 25.00 @ 26.00
Southern Car-Wheel, other brands 20.00 @ 22.00
Hanging Rock, Cold-blast.....24.00 @ 25.00
Warm-blast.....30.00 @ 31.00

Old Material.—The market for Scrap Iron is dull, with considerable lots of Ralls offered. We quote for cash as below:

Rails, 1/2 ton.....\$17.00 @ \$17.50
Car-Wheels, 1/2 ton.....14.00 @ 14.25
No. 1 Wrought, 1/2 ton.....70 @ 80
No. 1 Cast, 1/2 ton.....50 @ 55
Country Wrought, 1/2 ton.....55 @ 65
Boilers, cut, 1/2 ton.....45 @ 50
Axles, 1/2 ton.....1.00 @ 1.10
Flues, Tanks and Sheets, 1/2 ton.....35 @ 40
Burned Scrap, 1/2 ton.....35 @ 40

Imports and Exports.

IMPORTS.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending May 20, 1885:

Hardware.
Baker Hermann & Co.
Hardware, cutlery and guns, pkgs., 168
Davies, Turner & Co.
Cases, 2
Field Alfred & Co.
Cases, 4
Friedberger & Co.
Cases, 4
Gellert Isador.
Cases, 3
Gordon Otto.
Cases, 358
Graef Cutlery Company
Cutlery, cs., 2
Gurney F. B.
Case, 1
Hartley & Graham.
Nails, cs., 10
Judd H. L. Co.
Cases, 1
McCoy & Sanders.
Cases, 2
Montgomery & Co.
Cases, 2
Moore's Sons J. P.
Cases, 2
Noel Aug.
Cases, 4
Pim, Forward & Co.
Nails, kegs, 91
Schmidt H.
Machines, case, 1
Strutler, Lau & Co.
Mise, cs., 12
Taylor Thos.
Cases, 4
The Wellston Brick Co.
Mach'y, crate, 1
Vom Cleft & Co.
Mise, cs., 44
Wiesbusch, Hiler & Co.
Hardware & cutlery, cs., 4
Witte John G. & Bro.
Guns, cases, 2

Iron.
Baring Bros. & Co.
Bars, 7032
Wire rods, coils, 798
Nail rods, coils, 3574
Rough bars, 990
Brown Bros. & Co.
Bars, bbls., 132
Coils, 363
Coddington T. W.
Sheets, bbls., 323
Crocker Bros.
Spiegel, tons, 392
Iron, tons, 100
Chic. R. & A. P. R. R.
Wire, bbls., 696
Clinton Wire Cloth Co.
Wire netting, rolls, 228
Lundberg Gust.
Bars, 434
Naylor & Co.
Wire rods, coils, 363
Bundles, 992
Bars, 424
Perkins C. L.
Ferromanganese, tons, 500
Pim, Forward & Co.
Galv. tubes, bbls., 22
Reid John.
Ironwork, cs., 5
Tillotson L. G. & Co.
Wire, coils, 121

Order.
Tel. wire, lots, 18
Beam, 1
Spiegel, tons, 225
Iron drops, tons, 160
Spiegel, kg., 1,132.322
Rods, kg., 4567
Bundles, 2503
Plated ware, 990
Bars, 2244
Tubes for Mexico, bbls., 47

The imports at this port of Cutlery, Hardware and Metals for the week ending May 15 are as follows:

Quantity.	Value.
Brass goods.....	24 \$1,177
Bronzes.....	10 1,199
Copper.....	4,111
Clocks.....	23 2,456
Barbed.....	35 9,296
Guns.....	49 9,006
Hardware.....	18 709
Iron, pig, tons.....	1,501 30,515
Machinery.....	113 5,003
Metal goods.....	369 30,328
Needles.....	12 4,063
Old metal.....	5 2,640
Platina.....	7 233
Pins.....	9 1,759
Quicksilver.....	150 3,978
Reg. antimony.....	60 3,596
Saddlery.....	29 2,190
Steel.....	9,155 15,803
Silverware.....	9 292
Tin, boxes.....	41,299 169,565
Tin, slabs, 11,817; B.....	1,340,571 21,003
Wire.....	31 5,538
Zinc oxide.....	370 2,808

The comparison for two years since January 1 is as follows:

30 weeks	Same
of 1885.	time 1884.
Cutlery, pkgs.....	1,565 1,964
Hardware, pkgs.....	363 342
Iron, R. R. bars.....	9,422 9,422
Lead, pkgs.....	19,100 16,719
Steel, pkgs.....	779,126 587,140
Tin, bxs.....	687,148 678,781
Tin, slabs, bbls.....	5,964,521 6,690,363

EXPORTS.

The following list embraces the Exports of Hardware, Machinery, Iron, Metals, &c., from the Port of New York, for the week ending May 19, 1885:

Danish West Indies.
Ptm., gals., 4071 445
Sew. ma., cs., 2 30
Hdw., cs., 21 131
Saws, cs., 6 30
Tin, cases, 1 19
Mf. iron, pkgs., 12 90

Hamburg.
Quan. Val.
Ag. imp., pkgs. 425 12,732
Firearms, cs., 2 300
Clocks, cs., 170 2,363
Knif. ma., cs., 11 950
Sew. ma., cs., 418 2,977
Mf. iron, pkgs. 20 579
Mach'y, pkgs., 5 554
Ptm. gals., 764,172 63,910
Wash. ma., 12 175
Pumps, pkgs., 3 1,333
Hdw., pkgs., 293 5,423
Iron pipes, pcs, 136 14,800

Gottenburg.
Ptm., gals., 365,484 30,450

Bremen.
Ptm., gals., 1,515,501 117,400
Ag. imp., pkgs., 10 425
Hdw., cs., 6 127
Cutlery, case, 1 108
Sew. ma., cs., 1 40
Nails, cs., 34 245
Mach'y, pkgs., 18 2,223
Stamp ware, case, 1 62
Clothes, cs., 1 109
Tacks, cs., 4 49

Copenhagen.
Mf. iron, pkgs., 9 200
Hdw., cs., 9 195
Mach'y, pkgs., 3 250
Clocks, cs., 8 244
Ag. imp., pkgs., 1 30

Tuborg.
Ptm., gals., 365,394 30,443

Esbojorg.
Ptm., gals., 39,142 7,131

Stockholm.
Wringers, cs., 4 102

Antwerp.
Ptm., gals., 861,375 68,000
Musketts, cs., 2 40
Pumps, pkgs., 6 1,870
Cutlery, cs., 3 48
Sew. ma., cs., 213 3,278
Copper, cs., 54 7,500
Ag. imp., pkgs., 76 1,418
Hdw., cs., 28 456

Rotterdam.
Hdw., pkgs., 16 473
Mach'y, pkgs., 2 458
Copper, cs., 364 57,374
Ag. imp., pkgs., 13 423
Ptm., gals., 310,927 24,255

Stettin.
Ptm., gals., 1,000,374 132,746

Liverpool.
Mach'y, pkgs., 9 279
Hdw., pkgs., 57 1,271
Clocks, pkgs., 499 12,055
Ag. imp., pkgs., 6,106 1,066
Pistols, cs., 4 322
Rifles, cs., 2 184
Mf. iron, pkgs., 61 1,109
Cutlery, cs., 9 609
Wringers, cs., 6 135
Sew. ma., cs., 639 10,559
Copper, cs., 23,863 123,881
Cop. kettle, 1 72

Amsterdam.
Pumps, pkgs., 7 450
Hdw., cs., 8 115

London.
Ptm., gals., 446,102 38,500
Bullets, cs., 2 64
Mach'y, pkgs., 28 3,375
Cartridges, cs., 29 478
Primers, case, 1 58
S. rollers, cs., 284 2,767
Clocks, pkgs., 36 3,073
Pumps, pkgs., 3 169
Rifles, case, 1 292
Nails, cs., 10 325
Mf. iron, pkgs., 201 5,139
Scales, cs., 2 12
Empty shells, cs., 28 250

Hull.
W. mills, pgs., 4 153
Ag. imp., pkgs., 126 2,749
Sew. ma., cs., 106 9,190

Switzerland.
Hdw., cs., 5 340
Saws, cs., 2 259
Pumps, pkgs., 7 275
Scales, cs., 275 8,057
Hdw., pkgs., 20 1,018
Ag. imp., pkgs., 95 13,112
Mach'y, pkgs., 75 1,950

Plymouth.
Ptm., gals., 83,947 6,506

Cardiff.
Scales, bxs., 5 317

Glasgow.
Tinware, cs., 3 81
Hdw., cs., 14 213
Mf. iron, pkgs., 5 1,122
Sew. ma., cs., 124 2,218
Lead pipe, coil, 1 150
Mach'y, pkgs., 10 1,352

British Honduras.
Nails, kegs., 40 120
Hdw., cs., 30 431
Tinware, cs., 4 102
Cutlery, cs., 5 97
Ptm., gals., 5150 602
Ptn. slabs, 528 977
Sew. ma., cs., 7 115

British Guiana.
Clocks, cs., 3 53
Scales, cs., 2 123
Hdw., cs., 5000 488

British West Indies.
Nails, kegs., 165 346
Ag. imp., pkgs., 2 28
Ptm., gals., 32,125 3,349
Hdw., pkgs., 14 112
Sew. ma., cs., 9 179
Scales, cs., 11 272
Mf. iron, pkgs., 39 165
Needles, cs., 4 35
Firearms, case, 1 139
Cutlery, cs., 3 71
Tin plates, cs., 25 85
Metal, case, 1 60
Tinware, cs., 7 284
Lead, rolls, 2 22
Cartridges, case, 1 22
Scales, cs., 4 57
Nails, cs., 8 31

Newfoundland.
Ptm., gals., 1365 104
Hdw., cs., 6 26
Firearms, case, 1 139
Sew. ma., cs., 63 645

British East Indies.
Ptm., gals., 506,389 46,745

British Australia.
Ptm., gals., 183,500 21,897
Ag. imp., pkgs., 356 7,777
Mf. iron, pkgs., 350 5,824
Hdw., pkgs., 850 14,729
Wringers, cs., 29 692
Air guns, cs., 2 118
Pumps, pkgs., 46 2,031
Cutlery, cs., 91 888
Mach'y, pkgs., 23 475
Wringers, cs., 23 475
Clocks, cs., 187 3,566
Nails, cs., 6 98
Rifles, cs., 4 592
Windmills, pgs., 28 474
Stamp'd w. cs., 12 317
Wire g'ds, cs., 2 141
Saws, cs., 7 325
Tinware, cs., 11 317

Novia Scotia.
Ptm., gals., 298 32
Hdw., cs., 11 50
Mf. iron, pkgs., 2 50
Mach'y, pkgs., 1 40

Tasmania.
Ptm., gals., 43,300 4,500
Hdw., pkgs., 97 1,087
Nails, kegs., 50 200

Windmills. Quan. Val.
Sew. ma., cs., 43 700
Pumps, pkgs., 2 85
Ag. imp., pkgs., 11 361
Clocks, cs., 2 60
Wringers, cs., 4 61

Marseilles.
Ag. imp., pkgs., 52 1,500
Mach'y, pkgs., 1 10

Dunkirk.
Ptm., gals., 201,424 20,100

Barcelona.
Mf. iron, pkgs., 15 302
Sew. ma., cs., 54 755
Hdw., case, 1 10

Cuba.
Ptm., gals., 58,278 4,598
Nails, kegs., 374 888
Tinware, cs., 6 82
Nails, cs., 34 245
Mf. iron, pkgs., 224 1,350
Saws, case, 1 30
Firearms, case, 1 38
Clothes, cs., 2 25
Boiler, 1 2,100
Mach'y, pkgs., 44 584
Hdw., pkgs., 139 1,084
Scales, cs., 41 477
Nails, cs., 11 253
Spikes, kegs., 70 150
Copper, coil, 1 25
Cutlery, cs., 23 457
Ag. imp., pkgs., 3 57
W. ch. cs., 1 41
Car wheels, 50 350

French West Indies.
Ptm., gals., 359 27

Havre.
Copper, cs., 117 16,000
Mach'y, pkgs., 13 2,380
Ag. imp., pkgs., 67 3,080
Copper matte, bags, 512 3,500
Pumps, pkgs., 2 50
Hdw., cs., 2 72
Lead, pkgs., 31 190

Porto Rico.
Ptm., gals., 30,650 2,417
Mach'y, pkgs., 4 417
Nails, kegs., 55 145
Scales, cs., 11 253
Nails, bbls., 15 50
Mf. iron, pkgs., 48 272
Hdw., pkgs., 13 159
Ag. imp., pkgs., 9 211
Firearms, case, 1 20

Smyrna.
Clocks, case, 1 65

Palermo.
Metal g'ds, cs., 6 218
Hdw., cs., 16 418
Clocks, cs., 20 249

Hayti.
Cotton gin, 1 50
Sew. ma., cs., 3 240
Fish hooks, case, 1 20
Tin, gals., 616 50
Cutlery, cs., 2 25
Shot, bags, 10 15
Nails, kegs., 61 151
Scales, case, 1 5
Hdw., cs., 9 80

Trinidad.
Iron safe, 1 300
Cartridges, cs., 5 107
Pumps, pkgs., 8 572
Mf. iron, pkgs., 6 25
Pt., gals., 50,000 4,590
Ag. imp., pkgs., 130 1,025
Car springs, case, 1 110
Sew. ma., cs., 18 525
Clocks, cs., 19 500
Pistols, case, 2 292
Pistols, case, 1 290
Nails, kegs., 2 24
Nails, kegs., 10 160
Nails, kegs., 40 275
Hdw., pkgs., 2 75

Mexico.
Mf. iron, pkgs., 269 1,434
Cutlery, cs., 65 1,541
Pumps, pkgs., 14 455
Clocks, cs., 11 307
Cartridges, cs., 9 284
Turbine, 1 344
Mach'y, pkgs., 101 3,441
Hdw., pkgs., 36 925
Ptm., gals., 17,000 1,668
Nails, kegs., 154 446
Tinware, cs., 3 59
Firearms, case, 1 520
Ptm., gals., 1000 108
Sew. ma., cs., 24 476

Porto.
Windmills, 2 125

Trade Report.

General Hardware.

It is generally reported that more orders are coming in, but that in most cases they are small and for varied assortments of goods. Seasonable goods are in good demand. Prices in general remain without important change. The principal features of the market are noted below.

BARB WIRE.

Current business is reported fair by some manufacturers. There is, however, very sharp competition, and prices may be quoted 4.6 cents to 4.7 cents for carload lots of Four-Pointed Galvanized Barb Wire, and 4.8 cents to 5 cents for small lots.

The full text of the recent decision in favor of Messrs. Washburn & Moen is not yet at hand, the decision having been an oral one. It is understood, however, that it sustains the patent on the Glidden barb, which is one of the leading forms, and gives encouragement of a similar result on other barbs on which special suits will have to be brought.

NAILS.

The market has been very quiet, though in some cases sellers report a little more activity during the past few days. As a general thing, however, the demand continues severely disappointing, and the trade is harassed only too frequently by special occurrences. This week, for instance, it is reported that a round lot was forced on the market here at \$2.05. This, of course, is a special case and does not represent the market, but rumor often distorts such happenings. It tends to disturb the market and leads buyers to persist in holding off. Very little has been done in carload lots from dock. Store prices are nominally \$2.15 to \$2.20 for fair to round lots of Iron Nails, with an advance of 5 cents to 10 cents for Steel Nails. A review of the markets at other points will be found elsewhere.

SCREWS.

The Screw market presents the same abnormal and perplexing features as for several weeks past. The fact that the quotation of 90 per cent. discount is still made is referred to by many of the large trade as exceedingly troublesome to them, as in many cases they are unable to procure the goods at this figure, much less to sell them at this figure, which is, however, known to the smallest trade throughout the country, who are disposed to be dissatisfied if they do not obtain it. Many of the retailers have been unable to procure screws even for their current wants at this price, notwithstanding the fact that the Russell & Erwin Mfg. Co. are unquestionably selling goods on the terms of their circular, and turning out a great many screws at this figure. Parties who desire to purchase at figures which they regard as low, though not equivalent to this extreme discount, are said to be placing orders more freely, and a good many screws which are required at once are reported as purchased at but slight concessions beyond the circular prices of the American Screw Company and the other companies whose quotations are not far from theirs. As a result of this demand, and the fact that several of the companies are manifesting more indisposition to sell goods without what they consider a fair profit, the market is regarded, for the time at least, as slightly firmer. The disposition on the part of most of the companies is to permit manufacturers who are so disposed to sell as many screws as they desire at the extreme figures that have been made. In this condition of things it is manifest that the market is in an extremely unsatisfactory condition, and experienced observers are reluctant to risk a prediction as to what its course may be. It is thought by some that the extremely low quotations which are made will be indefinitely continued, and that the companies which are now endeavoring to strengthen the market will not succeed in the attempt. It is, on the other hand, suggested that there may be a very sudden change in the situation, and that the contention which has been carried on among the manufacturers with so much animation may before long be ended and prices revolutionized by the formation of a combination, with a pooling of their interests. The opinion is generally held that screws purchased at discount 90 per cent., or even at a slightly higher figure, must be a safe investment. It should be added that the matter of freight is to be considered as an important element in the price of screws at this juncture, the fact being that many of the companies holding to the higher range of quotations are delivering the goods to principal points, which is not the case when the discount of 90 per cent. is given.

MISCELLANEOUS PRICES.

Reports indicate that extras of from 5 to 10 per cent. on Tacks are being more freely given by the jobbers. The manufacturers outside of the combination are selling their goods at somewhat lower prices than the Central Mfg. Co., but the difference in price between inside and outside goods is not now nearly as much as before the recent reduction in price by the associated makers. The opinion is expressed that the manufacturers in combination are conducting their campaign with shrewdness and skill, and the wisdom of their policy is alluded to in making a heavy reduction in the price of

goods on which there is most outside competition, while many lines which the outside manufacturers are not largely making are kept at nearly the same figures as before, and consequently yield very satisfactory profits. There is no doubt that some of the outside manufacturers are inconvenienced by the condition of things which has been brought about by this action, while others are probably finding a satisfactory market for their goods and are in a position to keep in the market permanently and with a gradually increasing output.

Locks exhibit some irregularity in price. Many numbers are sold to careful buyers at net prices, which are lower than at the regular discounts. Small extras ranging from 5 to 10 per cent. are sometimes given.

Planes are held firmly by the manufacturers, who are reported to adhere strictly to combination rates. There is also less complaint of cutting by the jobbers, the small extras which have heretofore been given being in many cases withdrawn.

The advance in price of Copper is felt in manufactured goods in which this metal is a principal ingredient. Copper Rivets and Burrs, Sheet Brass and Copper, and Brass and Copper Wire, are as a consequence held somewhat more firmly, the extreme prices which have heretofore prevailed being in some cases withdrawn, and the whole line slightly higher and firmer.

Manufacturers of Wrought-Iron Pipe have been in conference, and as a result prices are slightly stiffer and quotations a shade higher.

Some of the jobbing houses are selling Padlocks at a base discount of 70 instead of 66 2/3 per cent., the regular figure. The prices on this line are somewhat weak, the fact being that small extra discounts are frequently given by some of the manufacturers and by many jobbers.

Apple Parers will soon be in season again, and manufacturers are busily engaged in putting the goods on the market. A number of new styles and improved patterns will be offered to the trade this year, as well as most of the standard styles with which the trade are already familiar.

Picks and Mattocks are selling at low figures, as they have been for some time. The manufacturers claim that there is little, if any, profit in making them at prevailing prices, but the competition is such that quotations are kept at their present level.

J. H. Brown & Co., Ottawa, Ill., and 229 Lake street, Chicago, quote as their prices to the retail trade as follows: "Perfect" Hog Rings, per dozen, \$3; "Perfect" Hog Rings, per dozen, \$2.

Fox's Lawn Rake, which is manufactured by the Withington & Cooley Mfg. Co., Jackson, Mich., a description of which is given among our Hardware Novelties, page 33, is sold at \$12 per dozen, subject to a discount of 60 per cent.

The "Boss" Trap, which is manufactured by J. B. Kendall, Washington, D. C., which is illustrated in his announcement on page 36, is sold at \$12 per dozen, discount 25 per cent., f.o.b. Washington. The special features of this Trap are alluded to as the perfectly noiseless manner in which it works; the ease with which it can be cleaned and the fact of its being self-setting and always ready for business. It is 20 inches in length, 7 inches high, covered with heavy wire gauze (six-mesh 21 gauge) fastened down with double-pointed tacks made expressly for the purpose. The wood is yellow poplar, the frame or catcher being of hardwood. The door in the top, and the hole in which the catcher is located, enable the trap to be thoroughly cleaned, which, by the way, is alluded to as an essential feature in rat traps of any kind. The number of rats which can be caught in a single setting is said to be only limited by the capacity of the trap.

THE CENTRAL STAMPING COMPANY, 25 Cliff street, New York, issue a circular of 16 pages, same size as their list, but illustrated, in which they describe with list prices a line of new registered and patented specialties of their manufacture. The list prices are as follows, subject to a discount of 33 1/3 per cent.:

"The Norway" Cooler.—Hammered, Patent Silver Finish.

Gallons..... 2 3 4 5 6
Each.....\$3.00 3.25 3.50 3.75 4.00

"The Mocha" Urn.—Hammered, Patent Silver Finish.

Nos..... 0 1 2 3 4 5 6
Quarts..... 4 6 8 10 12 14 16
Each.....\$4.50 5.00 5.50 6.00 6.50 7.00 7.50

"The Purse" Tea Kettle.—Hammered, Flat Bottom, Patent Silver Finish.

Inches..... 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2
Per doz.....\$6.50 7.25 8.00 8.75 9.50 10.25 11.00

"The Purse" Tea Kettle.—Hammered, Flat Bottom, Patent Silver Finish.

Inches..... 5 5 1/2 6 6 1/2 7 7 1/2 8 8 1/2
Per doz.....\$6.50 7.25 8.00 8.75 9.50 10.25 11.00

"The East Indian" Teapot.—Hammered, Patent Silver Finish, Copper Bowl Bottoms, Patent Trimmings.

Nos..... 313 314 315 316 317
Pints..... 3 4 5 6 7
Per doz.....\$6.00 6.75 7.50 8.25 9.00

"Case lots," one-half dozen of a size.

"The East Indian" Coffee Boiler.—Hammered, Patent Silver Finish, Patent Trimmings, Copper Bowl Bottoms.

Nos..... 3113 3114 3115 3116 3117
Pints..... 3 4 5 6 7
Per doz.....\$6.00 6.75 7.50 8.25 9.00

"Case lots," one-half dozen of a size.

"The East Indian" Tea or Coffee Pot.—Hammered, Britannia Spouts, Covers and Handles, Fire-proof Bottoms, Patent Silver Finish.

Nos..... 311 312 313 314 315 316 317
Pints..... 1 2 3 4 5 6 7
Per doz.....\$7.25 8.00 8.75 9.50 10.25 11.00 11.75

"Case lots," one-half dozen of a size.

"The East Indian" Tea or Coffee Pot.—Hammered, Britannia Spouts, Covers and Handles, Fire-proof Bottoms, Patent Silver Finish.

Nos..... 311 312 313 314 315 316 317
Pints..... 1 2 3 4 5 6 7
Per doz.....\$7.25 8.00 8.75 9.50 10.25 11.00 11.75

"Case lots," one-half dozen of a size.

"The East Indian" Tea or Coffee Pot.—Hammered, Britannia Spouts, Covers and Handles, Fire-proof Bottoms, Patent Silver Finish.

Nos..... 30700 3700 3710 3720 3730 3740
Pints..... 1 2 3 4 5 6 7
Per doz.....\$7.25 8.00 8.75 9.50 10.25 11.00 11.75

"Case lots," one-half dozen of a size.

"The East Indian" Coffee Boiler.—Hammered, Patent Silver Finish, Patent Trimmings, Copper Bowl Bottoms.

Pints..... 1 1 1/2 2 3 4
Round, per doz..... 8.25 8.75 9.25 10.50 11.75

"Case lots," one-half dozen of a size.

"The Yankee" Tea and Coffee Pot.—Bowl Bottoms, Buffed, Combination Trimmings.

Nos..... 130 131 132 133 134 135 136
Pints..... 2 3 4 5 6 7 8
Per doz.....\$3.75 4.00 4.50 4.75 5.25 5.75 6.75

"The Common Sense" Tea Kettle.—Flat Bottom.

Quarts..... 16 18 20 22
Retinned, Tin Bottom, per doz.....\$6.00 7.20 7.80 8.40

Quarts..... 24 26 28
Retinned, Tin Bottom, per doz.....\$9.00 11.40 12.60

Nos..... 16 18 20 22
Quarts..... 14 16 18 20 22
Retinned, Cop. Bottom, per doz.....\$7.50 8.20 8.90 9.60

Nos..... 24 26 28
Quarts..... 5 7 9
Copper, per doz.....\$22.75 28.00 30.00

Nos..... 16 18 20 22
Quarts..... 14 16 18 20 22
Nickel, Copper, per doz.....\$30.00 31.50 34.00

Nos..... 24 26 28
Quarts..... 5 7 9
Nickel, Copper, per doz.....\$24.25 31.25 38.25

"The Common Sense" Tea Kettle.—Pat Bottom.

Inches..... 6 7 8 9
Quarts..... 4 5 6 7 8 9
Retinned, per doz.....\$9.00 10.20 11.40 12.60

Galvanized, each......85 .95 1.05 1.15

"The Family" Water Pail.—IXXXX, Retinned.

Quarts..... 10 12 14 16
Per doz.....\$8.50 9.00 9.50 10.00

"The Family" Dipper.—IXXXX, Retinned.

3 quarts.....\$2.25 per dozen.

"The Cocoa" Dipper.—Stamped, Malleable Shank, Tin Shank.

No. 51 (Malleable), per doz.....\$1.15
No. 51 (Tin), per doz.....1.05

"The Pewter Mug" Cracker Bowl.—Stamped and Polished, Retinned.

Nos..... 1 2 3 4 5 6 7
Quarts..... 2 3 4 5 6 7 8
Open, per doz.....\$3.00 3.40 3.80 4.20 4.60 5.00 5.40

Covered, per doz.....\$4.50 5.10 5.70 6.30 6.90 7.50 8.10

"The Fifth Avenue" Colander.—IXXX, Half-Plated.

Large, 11 1/4-inch, per doz.....\$3.75
Extra Large, 13 1/4-inch, per doz.....6.75

"The Fifth Avenue" Salad Pan.—IXXXX, Stamped, Wide Flat Edge.

Quarts..... 17 21 30
Per doz.....\$7.50 10.50 14.00

"The Fifth Avenue" Wash Boiler.—IXXX, Half-Plated, Square Range, with Copper Bottom.

Nos..... 2 3 4 5 6 7
Each.....\$3.75 4.25 4.75 5.25 5.75 6.25

"The Patent" Silver Flour Sieve.—Seamless Body.

Mesh..... 14 16 18 20 24 30
Iron Wire Cloth, per doz.....\$2.00 2.30 2.65 3.00 3.35 3.75

Plated Wire Cloth, per doz.....2.75 2.85 3.00 3.15 3.45 4.00

"The Patent" Champion Flour Sieve.

Stamped, solid, perforated bottom, per doz.....\$1.30

"The Newport" Toilet Set.—Stamped, Oriental Decorations.

Colors..... Black, Green, Maroon, Blue, Red.
Nos..... 600 700 800 900 1000
Per set.....\$4.50 4.50 4.50 4.50 4.50

"The Progress" Oil Stove.

Single.
One 3-inch Two 3-inch Two 4-inch
Burners. Burners. Burners.

Nos..... 2 3 4
Each.....\$1.80 2.50 3.50

Double.
Four 3-inch Four 4-inch
Burners. Burners.

Nos..... 5 6
Each.....\$5.25 7.50

Trimnings for Oil Stoves.—All Cast Iron.

Ovens, each.....\$2.50
Broilers, each......80
Said Iron Heaters, each.....1.10

Cotton Wicks..... 3 4
Per doz.....\$0.50 .60 \$0.75 1.00

ITEMS.

The New York Plow Company, 55 Beekman street, are manufacturing a variety of Rollers for fields, lawns and roads. They refer to the demand for Rollers as being on the increase, and direct attention to the advantage that results from their use in compressing the soil upon the seed after sowing or planting, causing a more uniform growth, both in field and garden. Rollers for roads are made of a variety of sizes, and as large as 5 feet and weighing 5 tons.

The Union Hardware Company, Torrington, Conn., in their advertisement on page 16 illustrate their new style of Roller Skate. They direct attention to the advantage it possesses in the contrivance by which the heel adjustment is so made as to be able to grasp the small French heel or the large, common-sense heel of a lady's shoe. The company have recently enlarged their works and increased their capacity, having added an annex to their plating department and also to their wood turning department.

The West Lebanon Roller Mill Company, Lebanon, Pa., have recently shipped to Wilmington, Del., what is described as a monster Chain measuring 2000 feet, and have also received a Government contract for a thousand Chains to be furnished at once.

S. Roebuck, 164 Fulton street, New York, calls attention to the Roebuck Adjustable Screen to fit windows of different widths, and also to Wire Screens for doors and windows, and other goods in that line.

E. Roth & Brother, New Oxford, Adams County, Pa., issue a circular describing their Saw File Guides, Saw Set and Jointer, describing the construction and advantageous features of these articles.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Chambers street, New York, have just put on the market a line of Cast Steel Nail Hammers.

The Rugg Mfg. Co., Montague, Mass., have added to their line of manufacture the Dexter Stable Fork, which is described as made from best white ash timber, finished

and varnished. It is intended specially for handling straw, but is alluded to as a convenient article for other purposes. Their catalogue also exhibits their Snow Shovels (just now somewhat out of season), and their line of Hand Hay Rakes, of which they make several styles.

Schubert & Cottingham, 118 North Delaware avenue, Philadelphia, issue a catalogue of the line of Tackle Blocks, Sheaves, Bushings, &c., of which they are manufacturers, and on which they give the new list prices. The regular line of these goods is exhibited, with some specialties, and the Cleveland Malleable Iron Tackle Blocks are also included.

H. D. Edwards & Co., Detroit, Mich., issue a catalogue which is devoted to the line of Mill, Railroad and Vessel Supplies, Belting, Hose, Marine Hardware, &c., of which they are manufacturers and in which they deal. It is a convenient and well-arranged pamphlet of more than 100 pages, calling attention to a good many specialties, as well as the regular line of goods in the departments indicated. Among these the Patent Swinging Hose Rack may be mentioned, as well as their line of Smith's Belt Fasteners, to which they refer as meeting with gratifying favor, and to the merits of which they call attention in striking illustrated circulars and an effective poster.

The Pawtucket Mfg. Co., Pawtucket, R. I., will soon publish an illustrated catalogue showing a line of improved Machinery for the manufacture of Bolts, Cold Punched Nuts, Washers, &c.

The illustrated catalogue of Powell & Douglas, Waukegan, Ill., illustrates the line of Hunting, Fishing and other Boats of which they are manufacturers, and gives the prices at which they are sold. They allude in their circular to their facilities for building anything that may be desired in the line of Row and Sail Boats, Canoes, Sail and Steam Yachts on short notice. They also endeavor to keep on hand an assortment of Boats, so that parties desiring to purchase can find a selection of sample Boats to choose from.

C. L. BELLAMY & CO.,

for whom Sise, Gibson & Co. are agents, are putting on the market the line of Screw Drivers, Bits, Tack Claws, Patches, &c., indicated in the following list, the prices named in which are subject to a discount of 50 per cent.:

Screw Drivers No. 10.—Cast Steel, Round Handle.

Inches..... 4 5 6
Per doz.....\$2.25 2.50 3.00

Screw Drivers No. 50 (B. & E. Brand).—Cast Steel, Milled Point, Round Cocoa Bolo Handle. Especially made for Machinists' Use.

Inches..... 3 1/4 5 6
Per doz.....\$4.50 6.00 7.00

Points made 1/4 to 3/4 inch, as desired. Flattened Ebonized Handles, same price.

Screw Driver Bits.

No. 60, Cast Steel, Extra Finish, per gross.....\$16.50

No. 65, Cast Steel, Extra Finish, Clark's Pattern, per gross.....19.08

Nail Sets, No. 70.

Cast Steel, Octagon, Black Finish, 1/4 inch, per gross.....\$7.50

Cast Steel, Octagon, Black Finish, 5/16 inch, per gross.....7.80

Cast Steel, Octagon, Black Finish, assorted, 1/4 and 5/16 inch, per gross.....7.68

Nail Sets, No. 75.

Cast Steel, Square, Full Polished, 1/4 inch, per gross.....\$8.25

Cast Steel, Square, Full Polished, 5/16 inch, per gross.....9.48

Cast Steel, Square, Full Polished, assorted, 1/4 and 5/16 inch, per gross.....8.88

Prick Punches, No. 80.

Cast Steel, Black Finish, Octagon, 5/16 inch, per gross.....\$14.04

Solid Punches, No. 85.

Cast Steel, Octagon, Black Finish, Nos. 1 to 4.....\$12.60

Cast Steel, Octagon, Black Finish, Nos. 5 to 12.....13.80

Cast Steel, Octagon, Black Finish, 5/16 inch.....15.00

Tack Claws.

No. 105, Full Polished, Enamelled Handle, per gross.....\$10.50

No. 110, Cast Steel, Full Polished, Ebonized Handle, per gross.....25.08

No. 115, Cast Steel, Full Polished, Ebonized Handle, Riveted, per gross.....30.00

No. 118, Cast Steel, Round Tooth, Full Polished, Ebonized Handle, per gross.....30.00

No. 121, Cast Steel, Full Polished, Cocoa Bolo Handle, per gross.....31.08

No. 125, Cast Steel, Full Polished, Cocoa Bolo Handle, Riveted, per gross.....35.04

Tracing Wheels.

No. 130, Steel Wheels, Polished, Square Shank, per dozen.....\$1.68

No. 135, Steel Wheels, Polished, Round Shank, per dozen.....1.84

No. 140, Steel Wheels, Polished, Round Shank, Nickel, per dozen.....2.32

Ice Axes, No. 150.

Tempered Cast Steel Blade, 6 inches long, per dozen.....2.50

WHAT THE TRADE SAY.

The following communication deals with the cutting of prices, the continually recurring topic of discussion, with its lowering prices for purchasers and dwindling profits for producers and middlemen:

To the Editor of The Iron Age: I have read most of the letters in The Iron Age on the topic of cutting prices, because the subject concerns me, and it would seem that shopkeepers are the first to take in the true inwardness of Cardinal Richelieu's sublime confidence, "in the lexicon of youth which hope hath reserved for a bright manhood there is no such word as fail."

I would not disparage poetic sentiment or retard the legitimate influence of exhaled thought, but I have got money that says the merchant who persists in selling below cost will find in both the lexicon of youth and dictionary of age his fortune and his epitaph in that wretched, shameful word of fail. It may be there is nothing sinister in the apparent determination of traders to see how cheap a competitor can be tempted to sell—only a playful spirit to watch the longest pole knocking the perissimos, until it gets so short that the energetic knocker must splice or borrow from some lazy fellow on the field. In all events it is a fatiguing game, and just a trifle too expensive to retain popularity for more than one generation.

As a Hardware drummer 30 years ago I thought in selling goods cheaper than others I had hit upon the alchemist's secret of making gold. My customers did not tell me I was green, but I found it out, and the recollection produces an odd sensation in the leather-colored cheeks of to-day. There is no law against the cutting of prices; a pitiless sphynx-like necessity dominates them, sublimely innocent of law. It is easy at any time to change the market value of a given line of Hardware, though it is usually done by peremptory necessity, and must always be done at its source. The only way, of course, is through associations. For instance:

1. The organization of an association which shall regulate both the prices and production, and shall receive monthly reports of all sales made.

2. The association should be the repository of a forfeit from each member, guaranteeing good faith.

3. The association to receive, say, 1 per cent. on all sales made, with which to reimburse individual stoppages or restrictions of product ordered by it.

4. The costs of semi-annual meetings should be paid by the association from membership dues of, say, 1 per cent. on value of works represented, in order to equalize traveling expenses, &c.

If I thought a plan of this sort would work without keeping more than half of my associates awake after midnight, in order to devise some individual advantage out of it, I believe I would venture to present myself as a candidate for membership either as a Hardware merchant or Strap Hinge maker.

DRUMMER.

A manufacturer writes us referring to the orders he is receiving as indicating that merchants think the bottom has been reached and the time has come to buy. The margin of profit he refers to as very narrow, and adds that competition compels him to contrive new designs and styles that answer the purpose of the old at less expense. Then with reference to the irregularity in prices he says:

We think if manufacturers would strive more to sell their own goods and not be so readily disposed to cut prices or allow their selling agents

prices of the original Knox Fluters and the American Machine Company Winger, the latter being now listed as follows: No. 2 per dozen, \$36, and No. 2½ per dozen, \$48. Announcement is made, as we have already advised the trade, that they have disposed of their Spring Hinge business to the Van Wagoner & Williams Company, 82 Beekman street, New York, and also that they issue in a separate catalogue a description of their line of Ice Cream Freezers. This catalogue includes their Fluting Machines, the "Crown," "Knox," "American" and "Eagle"; Hand Fluters, Plating Machine; Mrs. Potts' Sad Irons; Ice Cream Freezers, the "American," "Crown," "Star," "Gem" and "Crown" double-action; the "Perfection" Scales, Ice Chipper, Wringers and other specialties.

Norwich Lock Mfg. Co., Norwich, Conn., have just issued a catalogue devoted to illustrations and descriptions of their line of Door Knobs with Patent Screwless Spindles. To this new patent device for attaching Knobs to Spindles, as explained in the pamphlet, they direct special attention and allude to the advantages which it possesses over other Knob Fastenings, especially the usual method of attaching with side screws, which soon become loose and easily drop out. The special features of their fastening are clearly exhibited, and the line of Door Knobs which they make with the Screwless Spindles are shown, as also patterns of Combined Roses and Escutcheons for the Knobs.

The Morris Sash Lock Mfg. Co., Cincinnati, Ohio, for whom Sise, Gibson & Co. are agents, 100 Chambers street, New York, have issued their No. 3 supplementary catalogue. It illustrates and gives prices on the "Triumph" Sash Lock, Sliding-Door Mortise Latches and Locks, Vestibule Latches, Reversible Mortise Knob Lock and a line of Sliding-Door Flush Escutcheons, Sliding-Door Pulls, Genuine Bronze Metal Escutcheons, Bell Pulls and Drawer Pulls.

The Wentworth Spring and Axle Company, Gardiner, Me., in their catalogue for the present year illustrate and describe the line of Springs and Axles of which they are manufacturers, giving the list prices. They refer to the fact that, notwithstanding the depression who has characterized the Carriage trade, the demand for their best grades has been very satisfactory, alluding especially to their fine Oil Tempered Springs and "New Dirigo" Double Collar Steel Axle.

AXES IN AUSTRALIA.

Our readers are following with interest the discussion which is going on in England with reference to the hold American Axes have on foreign markets, and as to the reasons for the existing conditions, and whether or not the English makers can recover lost ground. We desire to keep the trade and manufacturers informed with reference to these discussions, which, apart from the interest they have in relation to the Axe trade, may be of service to manufacturers generally as giving suggestions which they can turn to good account in their business. As they follow the arguments they will recognize the prime importance of making good Tools, and the value which is sure to attach in the course of years to a name which has established for itself a reputation for excellence. They will also be prompt to see the importance of adapting goods to the wants and even the prejudices of the markets for which they are intended. Even with the American readiness to break away from conventional patterns and methods, there are still some lines in which this suggestion should be given more weight than it sometimes receives. It will also be well to bear in mind that their competitors on the other side of the ocean are shrewd, energetic and enterprising, and will undoubtedly make great efforts to supplant American Axes and other goods wherever they can, and also to introduce them ahead of our manufacturers into new markets. Manufacturers here must then be prompt in adopting any measures which will strengthen their hold on trade which they are already supplying, and in introducing their goods into opening markets. The demand in many fields which are first opened to our trade is often exceedingly limited, but the early sales and the introduction of goods which meet with favor in many cases determine the character and course of trade for an indefinite period; for one of the lessons which our manufacturers may learn from this discussion concerning English and American Axes is the exceeding difficulty of displacing a line of goods which have been tested and are therefore favorably regarded by the users. Therefore it is the part of wisdom for American manufacturers to look closely and energetically into this matter of export trade, and to take possession of foreign markets at the earliest possible moment. We need only add that there seems little prospect that the English Ax-makers will succeed in depriving our manufacturers of the markets which they are now supplying, and to which they have sent goods which have established such a reputation for themselves that the sale of other American Tools and American Hardware generally will be greatly facilitated thereby.

The following letter, which appeared in the London *Ironmonger* of the 2d inst., will be of interest as giving an inside view of the condition of things in Australia more than 30 years ago, and the circumstances and conditions in which, according to the correspondent's view, American Axes obtained a strong hold in the locality of which

he writes. But apart from its value as bearing on the question under discussion, our readers will peruse it with interest as referring to the Hardware market more than a generation ago:

In 1852 I landed among the crowds of gold-seekers in the city of Melbourne, and went straight to the Ovens diggings. I arrived there when the Cross-cut Saw and Lyndon's Wedge-shaped Narrow Felling Axe were in high repute, when no party of diggers thought itself complete without one of each, when no hole could be sunk without clearing from five to ten trees, and cheering were the sounds of the see-saws and the hearty blows as the Axe echoes penetrated those golden gullies. Timber-felling was hard work then; bit by bit the chips rebounded while a ring was marked around the trunk to start the weary work of the Saw on the hard wood of the stringy and iron-bark trees. As far as I can remember I never saw an American Axe on the Ovens or Beechworth diggings; but when I left there for Forrest Creek in 1853 they were to be seen occasionally in the hands of Yankees and Californians, and I remember seeing them for sale first at the stores in Castlemaine, I think at 30¢ each. After a severe attack of dysentery on Campbell's Creek I left the gold-digger's occupation forever and entered the service of James McEwen & Co., in Melbourne, as warehouseman, and had Mr. George Cunningham, afterward M. L. C. and twice mayor of Geelong, as my mate. Here in this immense establishment I came in contact with English and American goods, and saw the English Axes, Spades, Shovels, Picks, &c., rejected and the American chosen instead. Of my own knowledge I cannot remember American Axes of Collins' make in those early days selling for less than 12/6 to 15/ each, wholesale, and Picks, Spades, Shovels, &c., in very similar proportion; but in this letter I will from henceforth confine myself to the Axe trade, more particularly in reply to Mr. W. A. Lyndon. After a sojourn of about nine or twelve months in Melbourne, I was engaged by Mr. Richard Parker, of Geelong, who did a very large trade with the storekeepers and settlers of the western district, including the gold-fields of which Ballarat was the center.

Just after my arrival in Geelong my employer received a large consignment of W. A. Lyndon's Wedge Felling Axes and Beardshaw's Cross-cut Saws through Henry Rogers & Co., Wolverhampton. I think there were about 12 dozen of the former and about 36 dozen of the latter. But in the meantime the American Axe had been introduced, and a great falling off in the sale of the old implements had taken place; no digger would think of taking a Cross-cut Saw and a Felling Axe when one tool, viz., a Collins' Axe, would do the work of both. I furnished a cottage for myself on my arrival at Geelong, and one of the indispensables was an Axe wherewith to cut big logs in my firewood into economical billets for my wife's use during the day. I purchased my Axe from my employer at his cost price of 12/6. It was a Samuel W. Collins' Axe; its edge was as keen as a razor and would split a hair. We sold them at 15/ each wholesale, and 18/ retail, at that time. I used that Axe for 12 years every morning before breakfast, and sold it as a good-going concern on my leaving the colony for Wales in 1866. After being in Mr. Parker's employ for 12 months—that is, in 1855—he paid a visit to England, and was away the best part of two years, having left the trading part of his business in my charge during his absence, with a stock of about £30,000 in value. At the time of his departure from the colony Collins' Axes were very scarce, and could not be bought for less than 20/ to 24/ each retail. Therefore my employer thought himself justified in taking with him a beautiful specimen of Samuel W. Collins' Axes to England and placing a very large order (I think about 60 dozen with handles and 20 dozen without) with W. A. Lyndon, to execute in imitation of the sample in every particular except the name; for Mr. Lyndon's name being well known as a maker of an excellent Axe of the old kind, it was thought that if he produced an Axe of a quality equal to Collins', we would assist to retain the trade in English hands. Mr. Parker trusted Mr. Lyndon to produce an article that would be a credit to himself, and, if successful, a certain source of future profit, &c.

However, in due time they arrived in Geelong, not packed in handy deal cases of one dozen each, with wooden stays to keep the one from chafing the other, but in clumsy elm cases containing four dozen each, with nothing introduced to keep them from rocking; the paper round each head was a coarse brown, totally unfit for the purpose, and, when opened, scarcely six Axes were found in each case without those vein like displays of rust along the edges so prejudicial to Edge Tools. They were not uniformly sharpened ready for work; there was none of that exquisite polish on the bright part as in Collins'; and, to make the distinction more complete, they were japanned blue instead of black. The labels were green, with black letters, instead of black with white letters, and an unsmoothed ash handle, instead of the beautiful hickory so peculiar to the American. Now, sir, how would you have felt if you were in my situation—a young man of 25 years of age, with your employer 16,000 miles away, to receive such a consignment as this? You may imagine my disgust and chagrin, after having fondly anticipated a profitable trade in them, having informed our up-country customers that the vessel was expected every day, and, indeed, having sold many of them to arrive, under the assurance of their being equal to Collins' in everything but the name. I did my best to dispose of them while the real Americans were still scarce; but their appearance condemned them immediately, and the diggings storekeepers. Nevertheless, we managed to place sample half-dozen in the principal stores and stations in the western districts (at a price which left us no profit), but seldom or ever got repeat orders, because, on trial, they could not be depended upon, being variable in temper; and there they lay on our hands, with a great host of other goods sent at random by English merchants, filling our stores, paralyzing our

trade, and putting us at our wits' end how to get rid of them; and by our endeavor to quit these Axes, to the exclusion of the real American, we did harm to our wholesale trade, of which Axes was an important item.

In course of time an abundant supply of Collins' Axes came to the market, with their prices reduced to their normal value, and were sold at a profit for less than Lyndon's Axes had cost my governor. The upshot of the matter was this: My employer, finding on his hands a large stock of English goods which storekeepers would not buy, opened branch establishments in newly-opened diggings, one after another, and vainly endeavored to dispose of them there, but they would not go. We certainly sold a few at first, but they were soon found out—no dependence upon their temper—and our branch managers writhed and anathematized us for sending such stuff when cartage was from £30 to £50 per ton, to add to their cost and unsaleableness, and there they lay in our five branch establishments, in company with the Cross-cut Saws and Colza-oil Lamps, while their neighbors were doing a roaring trade in Collins' Axes and Picks and Kerosene Lamps, demanded the same goods, got them, and flourished. Now for the sequel. I remained in Mr. Parker's service for nearly 12 years, and before I left I disposed of many dozens of the Cross-cut Saws to a Melbourne firm to cut up into Chaff-cutter Knives, and cleared Lyndon's Axes at from quarter to half the cost price, after having kept them in stock for from 8 to 10 years.

The foregoing will give you some idea of the annoyances which a colonial trader experienced in those days. There was no fault to be found with the Cross-cut Saws as such. They came to the market after the demand for certain sizes had ceased, but in the case of W. A. Lyndon's Axes it was a case of characteristic perversity prevailing among English manufacturers presuming to know better than their colonial customers what would suit their distant market, and an unwillingness to deviate from old-fashioned ways in the face of a new development, and my opinion is that, if W. A. Lyndon had sent those 80 dozen Axes (more or less), consigned through Mr. Thomas Sheppard, merchant, Geelong, for Mr. Richard Parker in 1855-56, of the proper description, as per sample and instructions accompanying it, W. A. Lyndon's name would have been to-day in as high esteem in our Australian colonies as is Samuel W. Collins'. Mr. Lyndon confesses in your issue of the 25th that they were not able, in the days I am speaking of, to produce an Axe equal to Collins'. Then why did they attempt it, and give the trouble, and cause such a loss to so worthy a tradesman as Richard Parker, of Geelong? That is the question; but I am glad to find by his letter that all this is altered, and, according to his assertion, Mr. Lyndon can produce Axes guaranteed uniformly equal to Collins'. If such is the case, he need have no hesitation in sending small consignments to each of the Australian colonies, for I have reason to believe that the colonists are still very anxious to confine themselves to British manufactures, provided they can be served as well as from other countries, quality and price considered.

Relating to the letter of Mr. Lyndon, which we published in our last issue, our contemporary contains the following which purports to be from an English Axe manufacturer:

A chord is struck by the letter of Mr. Lyndon which I trust may vibrate throughout the whole of the manufacturing circles of this country. With pleasure, but still also with regret, do I read this letter. The pleasure is great, as it must surely open the eyes of producers, and cause them to cut adrift the rope that has bound them. The regret is that they should so long have allowed trade to drift away, and, while doing so, have left them in "the fool's paradise." It is sad when one knows how orders have passed us, simply because the merchants would not inform the manufacturers what they learn through their travelers and correspondents; in fact, doing all possible to keep us in the dark, trusting that our ignorance may prevent us from enlarging our business. It is true we have moved about and seen for ourselves, and, when we have known the details, have carried them out as the colonial dealers have desired. If we will only throw aside all old-fashioned prejudices, and move with the times, some portion of the trade that has left this country may be got back. Timber is cheap enough to make packing cases in such a way as may be considered necessary by the colonial buyers.

I would say to my brother manufacturers: Do as I have done, go and see what is required, and you will soon be able to learn the cost of transit; depend on yourselves; the time is past for division of profits. I do hope this subject may be fully and amply considered, knowing how important it is.

The same issue contains also the following remarks from a gentleman who styles himself "Anglo-Australasian" referring also to Mr. Lyndon's communication:

What is plainer than Mr. Lyndon's acknowledgment that "the Yankee Axe almost superseded the English from the day it was introduced?" But what so many cannot understand is that the English makers should have permitted this. Thirty years ago the Americans bought the steel for their Axes in England, and then sent the manufactured article to Australia via England, yet no English maker made any serious effort to retain this trade. It appears to me that even to-day, if some energetic firm would go into this business thoroughly, much of the ground lost could be recovered. Steel, labor, capital and freight are in favor of England, and handles and packing cases of America. But the handle question is not a serious item, and perhaps some case might be thought of that would supersede the solid timber one now in vogue, and which adds to freight and land transport.

The prejudice so frequently spoken of will prove, I think, to be a myth so soon as an English maker with reputation produces an Axe equal to the Yankee one, and with a slight advantage in price, which should not be an insuperable difficulty. Why does not

Mr. Lyndon try his hand? No one producing the article need trouble about the merchant or middleman bugbear, for neither will help him until an established reputation exists. When that exists no doubt these gentlemen will talk about reserving them special discounts, to be added to the commission charged to their clients. The present quotations for American Axes of all brands can be seen with many firms in this country, as can the rates of sailer freights from America and England to Australia. A list now before me quotes: Freight, New York to Melbourne or Sydney, 30/ or \$7.50, per ton of 40 cubic feet; and from London, 17/6 to 20/; roughly, one-third less.

It will be remembered that Mr. Lyndon, in his letter, complained of the merchants to whom the Axe manufacturers sold their goods, because, when they found that the Axes sent to Australia were not suited to the trade, they failed to bring the matter to the attention of the manufacturers, so as to have the defects remedied and the goods adapted to colonial requirements. This point is taken up by another correspondent, who inquires whether the course of the manufacturer, in leaving it to the middleman to discover and inform him of the faults of his manufactures, while he himself remains ignorant of the price of his competitor's goods, rates of freight, &c., is to be taken as a fair specimen of the "cuteness" of the British manufacturer, and then asks whether it is surprising that trade passes from those who do not understand how to conduct a business into the hands of those that do. Referring to this same point another manufacturer says:

As a manufacturer I can hardly keep my temper while reading the letter of Mr. Lyndon. Some 25 years ago, when I came into my business, a considerable portion it was done through the middleman. Well; what with the petty deductions, such as half-cask allowances, &c., I, in complete disgust, laid down a hard-and-fast line, and in no way deviated. Finding the merchants' orders left me, except those they were compelled to give by their indents, I determined to go my own gait. The result is this: In my particular way of business I know thoroughly the requirements of my manufacture throughout the Australian colonies, India, Cape, South America, &c.; besides, I am conversant with the rates of freight, and I will conclude by saying that I know all the "ups and downs," and am complete master of my position. Had I continued under the thumb of the merchant, what should I have learned?

New Inventions.

A hot-blast stove for heating the air current from a blower engine to the furnace has been patented by J. O. B. Richards, of St. Louis, Mo. Within the stove are contained a number of bed-pipes arranged side by side. The blast inlet-pipe communicates with the first and last bed pipes at one end, while at the other end these two bed-pipes connect with the furnace. All the bed-pipes communicate with each other by the customary arch-pipes. In operating this stove the blast is admitted to, say, the right-hand bed-pipe and is discharged from the left-hand bed-pipe. After some time the current is changed by proper valves so as to enter the left bed pipe and to be discharged from the right bed pipe. In this way all the pipes in the oven are claimed to be kept from overheating.

An apparatus for removing coke from ovens and dumping it directly into the carts has been patented by G. W. Bierer, of Pittsburgh, Pa. The apparatus travels on a track and is placed directly in front of the oven door. A series of sliding picks are first moved forward and are raised by means of a lever. The picks are then moved backward and allowed to drop, so that they take hold of the coke and draw it from the oven into an inclined chute. The chute carries the charge down to a pan. From the pan the charge is elevated into the carts by means of an endless apron provided with buckets. As the oven is emptied the picks are made to enter further backward through a rack and gear connection.

A machine for splitting thick plate metal or broad bars of iron has been patented by C. M. Carnahan, of Pittsburgh, Pa. The machine carries a cutting tool which is attached to the lower face of a reciprocating head, to which quick upward, but slow and powerful downward, motion may be imparted. The cutting tool is provided with a depending lip which enters a slot in a lower die-box and serves as a guide. The metal plate to be slit is placed on a feed-table, with its edge against the lip. On the descent of the cutter a long and narrow slit will be punched out of the plate. The plate is then advanced so that the lip enters the slot just formed and constitutes a guide. The next descent of the cutter will increase the length of the slot, and in this way the operation is repeated until the plate is divided.

A process of purifying pig iron, which consists in tapping off the slag during the blow from a pneumatic blast, has been patented by J. P. Witherow, of Allegheny, Pa. A blowing engine of suitable construction is connected to a superheating stove from which the heated blast passes to a fixed converter. The converter is operated in the usual way, except that the slag is tapped off, through a slag-hole, at or about the period of the blow when the dissociation of the impurities is more or less complete, and before they begin to reunite with the metal. As the impurities are thus removed they cannot recombine with the iron at any subsequent stage of the process. The slagging-hole is located on a level with the metal line, and, owing to the effect of the blow and to the agitated condition of the highly-heated slag, the latter will flow out. By this process the silicon is claimed to be rapidly removed, while the phosphorus is less liable to return to the metal.

SCIENTIFIC AND TECHNICAL.

The Transportation of Petroleum in Bulk.

At a recent meeting of the Society for Encouraging Russian Navigation a paper was read by M. Valdemar on the carriage of naphtha in bulk—instead of in barrels or cans—as a new and abundant source of profit for the owners of small sailing craft trading in the Black Sea. "At the present time there are transported yearly from Baku by this means of cisterns in coasting sailing luggers 200,000,000 gallons of naphtha, kerosene and residuum to the mouth of the Volga; 20,000,000 to Enzelli, on the Persian side of the Caspian Sea, and from 8,000,000 to 10,000,000 to the Persian town of Resht and other places. The greater part of the Persian fleet of commercial sailing vessels on the Caspian is exclusively employed for the conveyance of naphtha in bulk. Besides these there are 40 or 50 Russian steamers and innumerable sailing vessels employed in this trade. Mr. Artemieff has four sailing vessels, two of which can carry 60,000 gallons each, while one vessel can manage 110,000 gallons and the fourth 36,000. These vessels perform from 9 to 14 trips—the medium is 11—a year between Baku and Dayvet Foot, a part of the Caspian Sea, a few hours' distance from Astrakhan, beyond which vessels drawing more feet of water cannot navigate, and they earn a freight rate of 1 kopek a gallon per journey, so that a vessel carrying 50,000 gallons earns 5000 or 6000 roubles a year. It was also shown that in consequence of the Baku-Batoum Railway having lowered its tariff for carriage of naphtha products to between 3 and 4 kopeks a gallon, and increased the number of its tank cars, that line will doubtless before long have to convey not less than 200,000,000 gallons of naphtha products yearly, and, therefore, hundreds of vessels will be required to carry these products, not only to the ports of the Black and Azov seas, but also to those of the Mediterranean Sea."

The Cost of the Distribution of Power by Electricity.

A pamphlet issued by the Safety Electric Power Company, using the Daft system, contains the following estimate of cost for the distribution of 500 horse-power, nominal radius of 2½ miles:

Two 250-horse-power engines	\$10,000.00
Five 100-horse-power boilers	6,000.00
Foundations, piping, &c.	2,500.00
Eight dynamos, aggregating 500 horse-power	20,000.00
Line (approximate)	10,000.00
Receivers	35,000.00
Switches, &c.	2,000.00
Total	\$85,500.00

Running Expenses per Diem.

Rent of premises	\$1.00
Coal (8 tons)	30.00
Engineers	6.00
Linemen	5.00
Two firemen	4.00
Station dynamo men	4.00
Outside receiver men	14.00
Ten per cent. depreciation	23.00
Oil, waste, &c.	5.00

Per diem.....\$95.00
It is assumed that 350 horse-power will be ready for delivery at any moment, and, following the ordinary practice of power producers, at least 600 horse-power can be rented therefrom to small consumers, limiting the delivery to, say, 10 horse-power for any one consumer; in this way an average of \$150 per horse-power per annum may be realized in New York City, which would therefore return as follows:

Six-hundred horse-power at \$150 per annum	\$90,000.00
Deduct running expenses	35,000.00
Leaving a net income of	\$55,000.00

or 65 per cent. per annum on prime cost. The plant for a 10-mile section of street-car lines, on the assumption that 50 cars are to be run and that 150 horse-power are ready for delivery on the track at all times, is \$62,000. Fifty loaded cars may be moving at the same time. Assuming a run of 16 hours per day per car, the expenses are put at \$49, or less than \$1 per car, whereas the care and maintenance of 400 horses, which cost originally \$50,000, is put at \$286.87 per day, or more than \$5 per car. Even should the figures be raised in the first case and lowered in the second, the advantages of electricity appear to be very great.

A Self-Contained Electric Lamp.

Recent experiments have been made in electric lighting to make each lamp contain its own battery, and have succeeded perfectly. This success has been affected by means of the Skrivanoff primary battery, the elements of which consist of a small packet of chloride of silver and two plates of zinc placed in the cell with a weak solution of caustic potash. A small battery is placed in the stand of a moderator or other similar kind of lamp, which can thus be utilized for the purpose, a glow-lamp being fixed on the top in place of the ordinary burner. A private demonstration of this invention was lately given at the establishment of Messrs. Blumberg & Co., No. 2 Cannon street, London, at which various lamps of the kind indicated were successfully shown in action. Taking one as typical of the rest, we may observe that it had a battery consisting of three boxes, each measuring only 4 by 2 inches by 1 inch, and which supplied the current to a glow-lamp of Italian manufacture, the light being an exceedingly good one. It was stated that it would burn for 12 hours with undiminished brilliancy, but that at the end of that time the silver would have been converted into pure silver and would require to be revived. This is easily effected by washing it in a solution of nitric and hydrochloric acid. It is then replaced in the battery for further use, there being no waste of the silver. The marked advantages of this system of domestic electric lighting, beyond the portability of the lamps, are the absence of fumes, the small battery capacity, and the great electro-motive force, this being 1½ volt for each cell, which is only 1 inch in width. Applied to the arc system, the Skrivanoff battery shows its power, light of 250 candles being produced from a couple of batteries measuring 10 inches long by 8 inches wide and 6 inches high.

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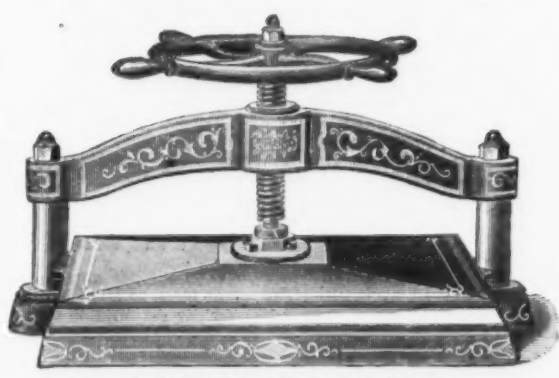
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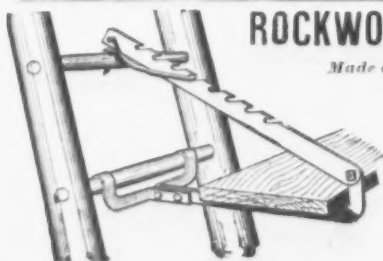
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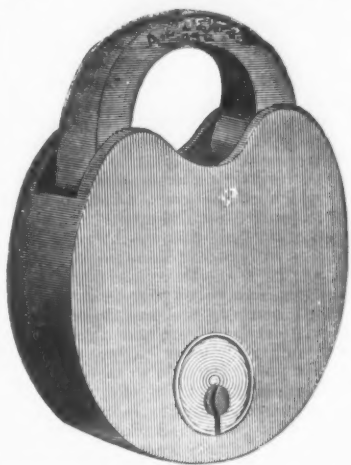


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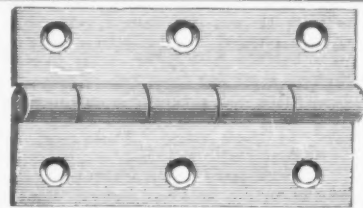
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Clings well to the Pulley.

Has no equal. In fact,

is THE BELT.

MAIN BELTING

COMPANY,

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Sts., Philadelphia.

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Light, Convenient, Compact and Effective.

It is made of the best Charcoal Iron, heavily Japan-

ned, and the catches are of the best English steel

awile. Price, 75 cents. Liberal discount to the Trade.

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The K. & W. Manufacturing Co.,

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CHICAGO OFFICE, 67 Washington Street.



REFRIGERATORS

TO GET THE BEST.
Buy the Leonard Clean-
able, with Movable Flues,
Hard wood, Carved Panels.
Warranted First Class;
Elegant and Durable.

MANUFACTURED BY THE

GRAND RAPIDS REFRIGERATOR CO.

Grand Rapids, Mich.

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Door Locks, Knobs,

BRONZE GOODS AND BUILDERS' HARDWARE.

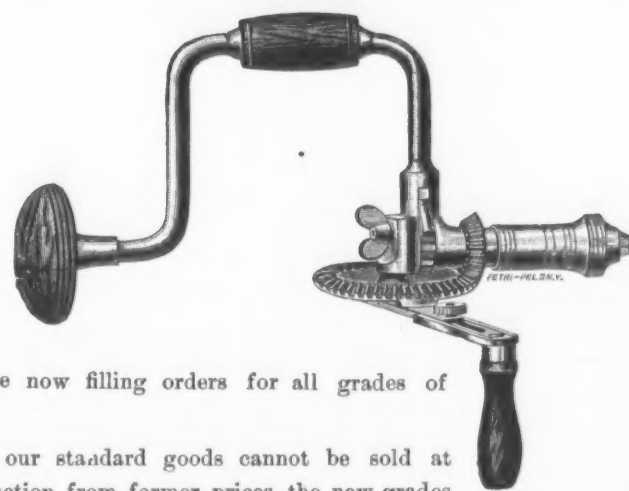
Soft Small Gray Iron Castings a Specialty.

CLEVELAND, OHIO, U. S. A.

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We are now filling orders for all grades of
Braces.

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much reduction from former prices, the new grades
will be offered at market rates for goods of like quality. Our Braces
are still covered by six good and valid patents, which have several
years to run. Quotations on our full line will be furnished on request.

MILLERS FALLS CO.,

No. 74 CHAMBERS ST., NEW YORK.

CHAMPLAIN
Forged Horse Nails.
MANUFACTURED BY THE
NATIONAL HORSE NAIL CO.,
Vergennes, Vermont.
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST
NORWAY IRON AND WARRANTED.
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New York Office, No. 221 Pearl, Corner Platt Street,
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BEST CHARCOAL BOILER PLATES, AND PLATE IRON GENERALLY.

ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we
manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when
desired. One hundred and sixteen tests of this iron, made during the last three years by the
U. S. Inspectors of Steam Vessels, show an average tensile strength of 88,808
pounds to the sectional square inch, and an average reduction of area of the fractured
section of 30% per centum. Our prices are as low as the production of a good article will admit of.



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New Spring Specialties—King Egg Beaters, awarded medal at American Institute, New York; King Candle Lamp and Lantern, cheapest combination ever made.

CHAMPION IRON FENCE CO.,

KENTON, OHIO.

Largest Iron Fence and Railing Works in U. S.

THE REIHER IMPROVED

Self-Locking Transom Lifter

answers equally well for all

Transoms.

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Hinged at the bottom.

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Cut showing the parts belong-

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A. The locking bar.

B. The self-locking adjusting

block.

C. The operating rod.

D. The lower bracket.

E. The lifting arm.

F. The transverse bracket.

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PURE TURKISH EMERY.

WALPOLE EMERY MILLS,

South Walpole, Mass.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

Business has been resumed in the Noble Stove Foundry, in Lynn, burned last week.

A readjustment of wages at the Taunton Locomotive Works recently took place.

D. S. Jenkins, of Brockton, is making 60 tons a month of horseshoe nails. His business has increased very largely recently. He is not a member of the association.

The Brainard Milling Machine Company, of Hyde Park, are making 35 machines on a foreign order. This company make some 30 different kinds of milling machines, and are just introducing an automatic gear cutter which does all the work from the start and will cut any shaped gear. It received a gold medal at the last mechanics' fair.

CONNECTICUT.

The New England Gas Machine Company, New Haven, have recently furnished the Tinguet Mfg. Co., Seymour, with a 500-light machine for heating and lighting purposes. This machine takes the place of one of the latest improved retort gas works in use there for some time.

The Excelsior Needle Company, of Torrington, who have been running only nine hours a day in most of their shop, commenced to work full time Monday morning of last week.

The factory of the Norfolk Shear Company, Norfolk, has been made more commodious by adding another story. This company have been crowded with orders all through the dull season and now are compelled to build.

The Peck, Stow & Wilcox Edge Tool Company's employees, of Southington, have resumed work after two weeks' idleness.

The Colt's Patent Firearms Mfg. Co., Hartford, are running their works on extra time to fill large orders for Gatling guns, recently received by the Gatling Gun Company from various foreign Governments.

Pocket-knife making has died out in Naugatuck, and the four large factories there are empty.

NEW YORK.

The Cedar Point Iron Works, of Port Henry, are to change their plant so as to convert iron direct from the blast furnace into steel ingots. Work will be commenced at once on the change, and J. P. Witherow & Co., of Pittsburgh, Pa., to whom the contract has been let, expect to have the new plant ready for operation in three months.

PENNSYLVANIA.

The furnaces in the new mill of the Phoenix Iron Company, at Phoenixville, are heated with coal which generates considerable gas. One of the furnaces was closed down for a short time on May 9. It became filled with gas in the meantime, and when started up the cold air coming in contact with the gas caused the furnace to explode. It was completely destroyed.

There was to have been another meeting of representatives of the Manhattan Hardware Works and the Reading Land and Improvement Company last week, with a view of arriving at a satisfactory conclusion about the amount of land to be given to the hardware company for the location of their works. The land company are willing to give 2 acres and the hardware company want from 5 to 7 acres. It is the intention of the company to erect all of their buildings only one story high. The foundry would be about 100 x 200 feet in size, sufficient to accommodate about 100 molders, and all the remainder of the buildings in proportion.

Wm. H. Everson & Co., will build a new bar mill at Scottsdale, Westmoreland County, during the coming summer. The ground has been surveyed and carpenters are at work making some of the patterns. Work will in all probability be commenced in about 60 days in earnest. It is also rumored that a nail factory will be built at Scottsdale by another firm.

Changes are being made in the old foundry at Moller's Pipe Works, Reading. The three pits are being changed respectively from 3 to 4 inch pipe, 4 to 6 inch, and the largest from 6 to 12 inch pipe. The various flasks and spindles are also being changed and altered from one pit to another. In the new shop the pipes will be changed from 12 to 24 inch, this week, to fill a large order, and in a short time all pipes will be 20 inches at one of the pits in the new foundry.

The Ellis & Lessig Steel and Iron Company, Limited, put their new rolling mill in operation at Pottstown on May 8, and their new nail factory on May 11. The mill building is 70 x 146 feet, and the factory is 70 x 224 feet. The roll train is three-high, supplied with two Smith's gas heating furnaces. The factory contains 50 nail machines, which are to be increased to 90. A puddle mill to contain six double puddling furnaces is in course of erection.

One of the foundries of the Reading Hardware Company, Reading, closed down on May 13 for repairs, and for three weeks to come some 60 molders and helpers will be idle. The new three-story brick addition recently erected is now being furnished throughout and will be used for the making up of butts and hinges.

One of the Douglass furnaces, at Sharpsville, went into blast last week, making 3 of the 10 furnaces in that town in operation.

The rolling mill of the Coatesville Iron Company, at Coatesville, Chester County, which had been standing idle for several months, was started up on May 11 on single turn. The mill has changed hands, and the new managers hope to be able to give the hands steady work for some time.

New York parties have been negotiating for a building lot in Reading, about 130 x 30 feet, upon which to erect an establishment for the manufacture of fancy and decorated glassware.

The Somerset Chemical Works, 1 mile from the town of Somerset, were utterly demolished last week by an explosion of

nitro-glycerine and dynamite. There were 800 pounds of nitro-glycerine and 3000 pounds of dynamite in the several buildings. W. T. Beach, of New York, one of the proprietors of the works, was blown to atoms, but his was the only life lost, none of the 12 or 15 men usually employed being in the works at the time. The whole town of Somerset was shaken.

A number of Pittsburgh capitalists have been consulting with Uniontown parties looking to the establishment of an iron mill there. Uniontown has been asked to furnish inducements.

The Machine Tool Works, Frederick B. Miles, engineer, Twenty-fourth and Wood streets, Philadelphia, has been united with the Industrial Works, William B. Bement & Son, Callowhill and Twenty-first streets, Philadelphia, and hereafter the two establishments will be conducted as one by William B. Bement, Clarence S. Bement, Fred. B. Miles and William P. Bement, under the firm name of Bement, Miles & Co.

PITTSBURGH AND VICINITY.

During the year ending May 1, 1885, Isabella Furnace No. 2 made the large product of 68,269 tons of pig iron, an average of 5689 tons (of 2268 pounds) per month.

The Speer Sand Works, located about 2 miles from Connellsville, were totally destroyed by fire at an early hour on May 12. The loss will reach \$10,000, on which there is insurance aggregating \$7500, held in Pittsburgh companies. The works were owned by the Speer White Sand Company, of Pittsburgh.

The Atlas Coke Company left their charter for record on May 12. Governor Pattison having granted it on May 11, 1885. The capital stock of the company is \$40,000, divided into 400 shares. Their property is situated in Dunbar Township, Fayette County. W. A. Shaw, of Sharpsburg, is the principal stockholder, he having 340 shares.

J. B. Corey, formerly of Corey & Co., Braddock, has leased the Duquesne coal mines, at Swissvale, on the Pennsylvania Railroad. Mr. Corey will probably run the mines on the co-operative plan.

Sixteen boys employed at the Iron City Chain Works struck for higher wages on May 13. They have been working at 50 cents per day, and demand 60 cents.

The Fort Pitt Mill, of Graff, Bennett & Co., has deferred starting until certain alterations insisted upon by the insurance companies in regard to the natural gas supply have been made.

OHIO.

The Belfont Iron Works Company, of Ironton, recently drilled a well to the depth of 2042 feet in search of gas, but finding none, abandoned it, not being inclined to risk more capital in the endeavor. Citizens of Ironton, however, have been agitating the matter of obtaining a supply of natural gas for the works of that city, and a number of prominent business men recently held a meeting and took steps toward raising a fund to be used in drilling the well 500 feet deeper, or until gas is found.

Elbel & Co., successors to Elbel, Gilliam & Co., manufacturers of saddlery hardware, Canton, whose works were almost entirely destroyed by fire on December 28, 1884, have closed their contract for the erection of five new brick buildings, and expect to blow their first steam whistle early in July. The new works will be superior in every respect to the old. They will be much more isolated, fitted with every available safeguard against fire and furnished throughout with the latest improvements in machinery.

It is reported that the proprietors of the American Standard Bolt Works, of Chicago, Ill., have definitely decided to remove to Cleveland. The Mahoning Valley Iron Company, of Youngstown, are said to be interested in the new enterprise, and the works will have plenty of capital to make them a success.

The Bellaire Nail Works shut down in all departments on May 15. The blast furnace of the company will, however, continue in blast for some weeks. There seems to be little prospect of a resumption of work unless the men accede to the company's demands.

There is talk of capitalists taking hold of No. 2 Stack of the Etou Iron Works, at Ironton, and starting it up.—*Trade Review*. [This furnace, which has never been entirely completed, is of the same size—86 by 18 feet—as Stack No. 1, which was first blown in in 1875.]

MISSOURI.

Leslie A. Moffet, receiver for the Harrison Wire Works, has been given leave by Judge Lubke, to expend \$200 in painting the iron-work and machinery in the Harrison Wire Works building for the purpose of preserving the same from the effects of rust and disuse.

The Standard Stamping Company, of St. Louis, have removed their offices and ware rooms to the building formerly occupied by Hill, Clarke & Co. on North Second street. The removal will increase their factory space at their present quarters fully 50 per cent.

The Missouri Boiler and Sheet Iron Works, John O'Brien & Co., proprietors, of St. Louis, will furnish the boilers, cupolas, &c., to be used in the new steel plant of the Western Nail Company, at Belleville, Ill.

The Western Forge and Tool Works, St. Louis, have just put in a powerful punching and forging machine, of Philadelphia make, specially adapted for steel tools. All their other machinery is in position and is fairly employed at their new place of business on Collins street.

The explosion of the air receiver at the Missouri Furnace Company's plant last week resulted in the loss of only a few hundred dollars and delayed operations not over half a day.

The Hoyt Metal Company, of St. Louis, have completed their removal to their new works on the Wabash Railway, near Boyle avenue, Rock Springs.

MICHIGAN.

Vulcan Furnace, at Newberry, has gone out of blast, to admit of needed general repairs being made. The force of employees will be given work about the plant until the furnace is ready to resume operations, which is an indication that it will not remain closed down for a great length of time.

ILLINOIS.

A St. Louis paper says: Gen. W. H. Powell, president of the Western Nail Company, during his recent trip to Pittsburgh, Pa., let contracts for machinery for the manufacture of steel nails aggregating about \$50,000, and the total expenditure, when the works at Belleville are ready for operation, will reach fully \$75,000. The steel is to be made by the Clapp & Griffiths process.

Crane Brothers Mfg. Co. of Chicago, will erect at once a three-story and basement brick factory on Jefferson street, immediately south of Van Buren. The factory will front 180 feet and have a depth of 60 feet.

T. C. Paulsen, of Chicago, has removed from Franklin street to larger quarters on South Canal street. He proposes to make a specialty of drilling and tapping small castings, and is now busy upon large orders for roller-skate machinery.

G. K. Schoenberger has purchased the Chicago Steam Engine Works. The works are now running, and some new tools will be added to their mechanical equipment. Steam-engine and general machinery will be manufactured and repaired.

A pair of yacht engines has just been built for A. Booth, of Chicago, by Charles F. Elmes, of the same city. From Mr. Elmes's establishment also have just been shipped a number of coal-mining machines to Ohio parties.

The Jefferson Mfg. Co., of Chicago, were incorporated early last week, to manufacture and sell bolts and nuts, safety-valves and other metal articles. The capital stock is \$75,000.

INDIANA.

The Ohio Falls Works, at New Albany, are again in full operation. They were closed for three days, it was thought for repairs, but the wear and tear was greater than expected, and it took about 10 days to get into shape and under way again. Mr. Stoy, the president, says he regrets having lost so much valuable time, as he has good orders to fill, which will keep him busy for some time. In addition to his large pile of scrap he is taking in a lot of Southern pig iron, which is making No. 1 muck bars.

The New Albany Rail Mills are running on slack time, but will soon be in full operation. Their American Foundry, adjoining the mills, is kept very busy, and is being enlarged, &c., well regulated by the new foreman, Mr. Miller, who was the boss molder of the Louisville and Nashville shops in Louisville.

VIRGINIA.

The Old Virginia Nail and Iron Works, at Lynchburg, which were closed on April 25, on account of an overstock, have received an unexpected run of orders, and the nail mill was started on May 11 at its full capacity.

Gem Furnace, of the Shenandoah Iron Company, of Milnes, Page County, has started again and is working at its full capacity.

Crozer Furnace, at Roanoke, owned by the Crozer Steel and Iron Company, of Thurlow, Pa., having been relined and put in

excellent, and gives good satisfaction. Several strong advocates of Fire Creek coke have changed their minds and bought largely of Connellsville, convinced by the superior quality of the latter and its cheapness.

Charles Steglitz has moved his Variety Foundry to Ninth street, between Jefferson and Market, Louisville, into a large and new building. He has put up a new plant of engine, boilers and cupola. Mr. Craig has refitted and modified Steglitz's old works.

Fig. 2 shows the No. 15 bench press, a new form of press made by Mr. E. W. Bliss which is said to be meeting with much favor among manufacturers of small articles in brass and tin. The shaft is of forged steel and is fitted with a patent clutch. The wheel is 18 inches in diameter, 3 inches face, and weighs 65 pounds. The motion of the slide is 1½ inches, and adjustment 1½ inches. The opening in the bed is 6 x 4 inches, and the width of the opening through the press 5 inches. The distance back from center of slide is 3 inches, and the distance from bed to slide when up is 6½ inches.

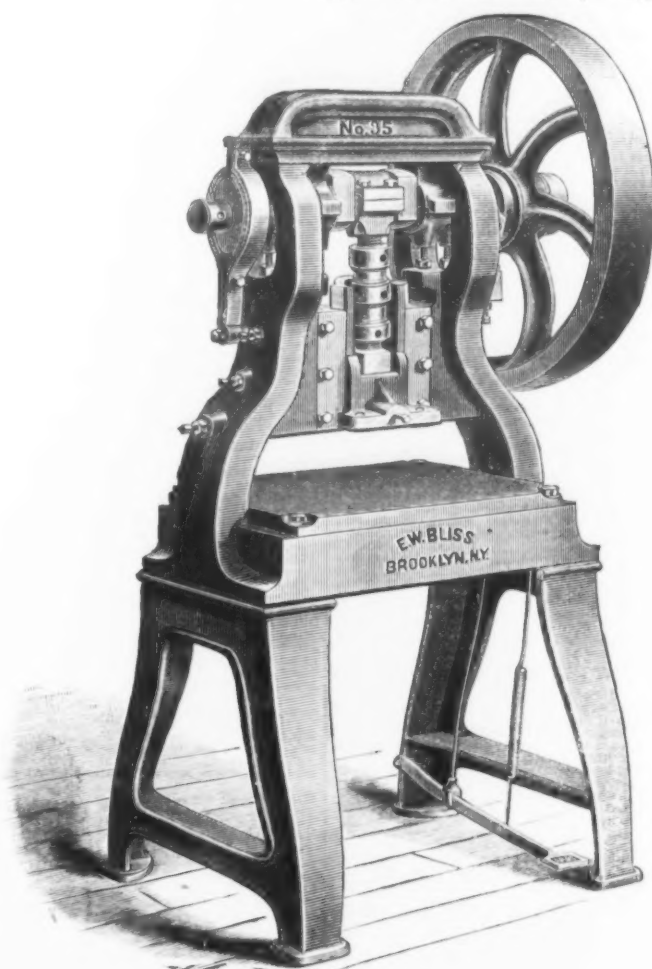


Fig. 1.—No. 35 Power Press.

The Louisville and Nashville Railroad shops are kept working full time building new freight cars. The road had a great demand from the Southern furnaces for cars for shipping pig iron, last winter, and wish to be prepared for increased freights during the next busy season. Their new freight shed is about completed, which has a receiving capacity of several thousand tons and adds many facilities to shippers.

The total weight of the machine is 400 pounds, and the bench room required 16 x 18 inches. This press is designed for such work as tops, bottoms and caps for all kinds of small cans, umbrella trimmings, buttons, small brass articles of various kinds and other similar work. No. 13 bench press, by the same manufacturer, illustrated in Fig. 3, is adapted for a somewhat lighter class of work than is done by the No. 15 press. The press weighs, complete, 150 pounds.

Punch and Power Presses.

Mr. E. W. Bliss, 17 Adams street, Brooklyn, N. Y., has recently brought out some new presses, cuts and brief descriptions of which are given below. Fig. 1 shows a perspective view of his No. 35 power press, which has just been put on the market.

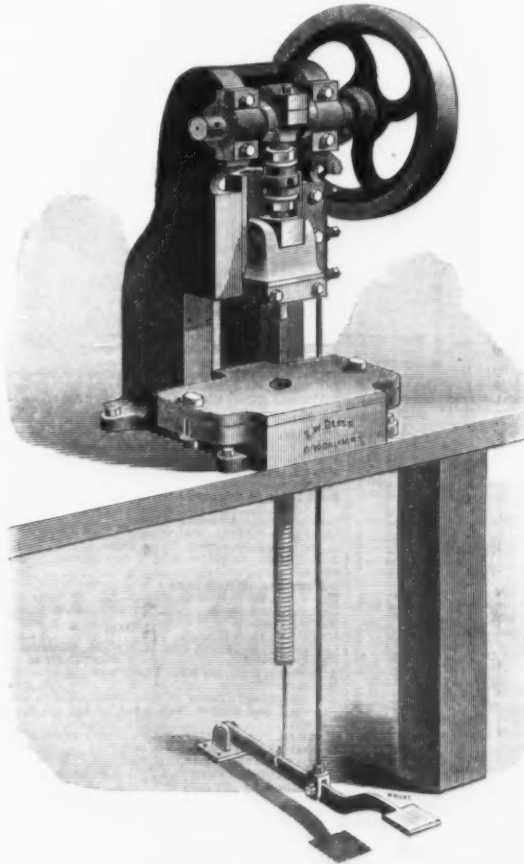


Fig. 2.—No. 15 Bench Press.

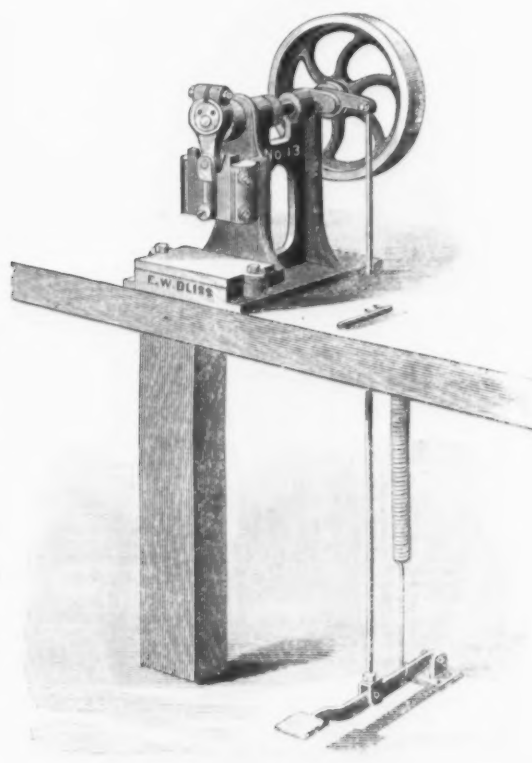


Fig. 3.—No. 13 Bench Press.

first-rate condition, will go into blast again as soon as it is dried out, which will probably be this week. Mr. Austin Farrell, who has been manager of the Lynchburg Furnace, will be furnace manager at Crozer; Col. D. F. Houston will continue to be general manager.

KENTUCKY.

Within the past month over 1,300,000 bushels of 72-hour Connellsville coke have been delivered at Louisville by water, some of the foundries laying in a year's supply. The quality of the coke received has been

The press is designed for cutting and forming a large variety of tin and light-iron work. The wheel is 34 inches in diameter and weighs 400 pounds. The steel crank-shaft has large and long bearings, and is provided with a patent clutch and with a friction brake. The bed has an opening of 14 x 20 inches. The distance between uprights is 28 inches, and from bed to bottom of slide 7½ inches. The motion of the slide is 1 to 2 inches, as desired, and the adjustment of the slide 2 inches. The total weight of the press, complete, is 1800 pounds.

railroad rates arbitrarily. The Cullom bill provided for a commission and passed the Senate. A large number of gentlemen interested in trade and transportation will be invited to give the committee the benefit of their experience and views.

The American Institute of Electrical Engineers, Dr. Norvin Green, president, held their first annual meeting in this city last Tuesday evening. The membership numbers 300.

Boss and Silver Capped Screws,dis 40
Lag or Loege,dis 75 & 80
Coach Patent (Gimlet) Point,dis 75 @ 75c
Machinery.
Machine, Flat Head, Iron,dis 60
Machine, Round Head, Iron,dis 55
Bench, Wood, Hickory,dis 55
Bench, Wood, Hickory,dis 55
Hand Wood,dis 25 & 10 @ 25c
Hand Rail, Humason, Heckley & Co.,dis 70
Hand Rail, Am. Screw Co.,dis 70
Scroll Saws.—Leather, complete, \$10.00,dis 25
Rogers, complete, \$4.00,dis 25
Scythes.
Blood's, Grains,dis 83 & 40
Blood's, Grain,dis 83 & 40
Other brands,dis 83 & 40
Scythe Sanths.dis 10 & 2
Shears and Scissors.
American (Cast) Iron,dis 75 & 10 @ 80
Barnard's Lamp Trimmers,dis 25
Timmer,dis 25
Helmach's, List, Dec. 1881,dis 60
Heinrich's Tailor's Shears,dis 25
Mace, Cutlery Co. St. Trimmers,dis 80
Acme Cast Shears,dis 80 @ 80c
Diamond Cast Shears,dis 10
Victor Cast Shears,dis 10c
Wise, J., & Sons' List, Dec. 1881,dis 60 & 80
Howe Bros. & Hulbert, Solid Forged Steel,dis 10
Shovels.
Sliding Door, M. W. & Co., List,dis 60 & 5c
Sliding Door, R. & E. list,dis 60 & 10c
Sliding Door, Corlies' list,dis 60 & 10c
Sliding Door, Patent Roller,dis 60 & 10c
Sliding Door, Patent Roller, Hatfield's,dis 70
Sliding Door, Moore's Anti-Friction,dis 60 & 10c
Sliding Shutter, R. & E. list,dis 60 & 10c
Sliding Shutter, Corlies' list,dis 60 & 10c
Sliding Shutter, Reading list,dis 60 & 10c
Moore's Anti-Friction (Hanging), New list,dis 25
Ship Tools.—J. A. & J. White,dis 25
Shovels and Spades.
Ames' Shovels, Spades, & Ames' brands,dis 20
Some special brands of Ames' goods,dis 20
Griffith's Black Iron,dis 50c
Sliding Door, Corlies' list,dis 60 & 10c
Griffith's Solid Cast Steel R. R. Goods,dis 60
Old Colony,dis 15
Hussey, Binns & Co.,dis 20 @ 50c
Lehigh Mfg. Co.,dis 50c
Pettenbone & Son, list Jan. 2, 1882,dis 50c
R. T. Pettenbone, Pat. Shovel, new list,dis 30
R. T. Pettenbone, Pat. Scoops, new list,dis 30
Livingston's (Lowman's) Patent,dis 30 @ 10c
Rowland's, Black Iron,dis 60 & 10c
Rowland's Steel,dis 60c @ 60c
Shovels and Tongues.
Iron and Brass Head, R. & E. list,dis 60 & 10c
Iron and Brass Head, P. S. & W.,dis 50c & 10c
Polished Steel, new list,dis 50c & 10c
Sieves.
Buffalo Metallic, S. S. & Co., new list,dis 35 & 40
Barler's Iron Sifters,dis 25
Slates.
Square Frames, by case,dis 45
Spoke Shaves.dis 45
Spoke Trimmers.
Bonney's,dis 10.00, dis 50
Stearns',dis 40.00, dis 20
Ives', No. 1, \$15.00; No. 2, \$12.00, dis 40, dis 55 & 10
Sponges.
Basting, Central Stamping Co.'s list,dis 35 & 2
Solid Table and Tea, Central Stamping Company's list,dis 35 & 2
Britannia,dis 50c
Meriden Brit. & Co., Rogers,dis 50c
Holmes, Booth & Hayden,dis 50c
Holmes & Edwards Silver Co.,dis 50c & 10c
Crescent Silver,dis 40c & 10c
H. & E. Silver Co. Steel Silver-Plated Tea,dis 40
\$15; Tables, \$30,dis 50 @ 50c & 10
Tin (Cowles Hdw. Co.), case lots,dis 10
Squares.
Steel and iron,dis 60 & 10
Try Square and T Level,dis 60 & 10c
Disston's Try Square and T Bevels,dis 45c & 10
Waterbury's Try and Titer,dis 20c & 10
Steelyards,dis 40 & 10c
Stocks and Dies.
Lightning Screw Plate,dis 10 @ 10c & 10
Stone.
Hind Stone, No. 1, 6f; Ax, 8f; Slips, 10f,dis 40
Sand Stone,dis 50
Washita Stone, Extra,dis 10c
Washita Stone, No. 1, 6f, 13c
Washita Stone Slips,dis 10c
Arkansas Stone, No. 1, 4 to 6 in., 6f, 13c, dis 10
Turkey Oil Stone (Chase), 4 to 8 in., 6f, 13c, dis 10
Turkish Slips (Chase),dis 10c
Lake Superior Slips (Chase), 6f, 13c, dis 10
Grindstones, Family, Loring's,dis 10
Stove Boards.
Buffalo Zinc, S. S. & Co.,dis 50
Stove Polish.
Joseph Dixon's,dis 60, dis 10
Gem,dis 60, dis 10
Gold Medal,dis 60, dis 10
Mirror,dis 60, dis 10
Lauro,dis 60, dis 10
Ruby,dis 60, dis 10
Rising Sun,dis 60, dis 10
Dixon's,dis 60, dis 10
Boynton's Noon Day, 6f, 13c, dis 10
Small, 6f, 13c, 3 medium, 4f.
Tacks, Brads, &c.
New List, Sept. 1, 1882
American Iron Carpet Tacks, all kinds,dis 60
Steel Carpet Tacks, all kinds,dis 55
Swedish Iron Carpet Tacks, all kinds,dis 50
Swedish Iron Upholsterer's Tacks,dis 50
Tinned Swedes Iron Upholsterers' Tacks,dis 50
American Iron Carpet Tacks,dis 50
Copper Tacks,dis 50
Copper Finishing and Trunk Nails,dis 50
Gimp and Lace Tacks,dis 50
Finishing Nails,dis 40
Hungarian Nails and Miners' Tacks,dis 35
Gimp and Lace Tacks,dis 30
Tinned Gimp and Lace Tacks,dis 30
Trunk and Clout Nails,dis 30
Tinned Trunk and Clout Nails,dis 30
Chair Nails,dis 30
Common and Patent Nail,dis 30
Tinned Capped Trunk Nails,dis 30
Looking-Glass Tacks,dis 20
Picture Frame Putty,dis 20
Leathered Carpet Tacks,dis 20
Brush Tacks,dis 20
NOTE.—Tacks of outside makers 5 @ 10 less than above prices.
Double-pointed Tacks,dis 75 & 10 @ 75c & 10c
Wire Carpet Nails,dis 50
Steel Wire Brads, R. & E. Mfg. Co.,dis 40 & 10
Take-Out-Nating.

SOLE MANUFACTURERS OF
**THE AMERICAN
DYKES ELECTRO-PLATING
MACHINE.**

**Best Plating Machine
In the Market.**

HEADQUARTERS FOR
EVERYTHING
IN THE PLATING AND
POLISHING LINE.

Dykes & Lee Chemical Works

Parallel, Simpson's Adjustable	...	dts 46 1/2
Saw Filers, Bonney's, Nos. 2 & 3, 3/4 doz	\$15.00	dts 46 1/2
Saw Filers, Bonney's, Nos. 1 & 2, 3/4 doz	\$15.00	dts 46 1/2
Saw Filers Hopkins'	...	dts 47 1/2
Saw Filers, Reading	...	dts 48 1/2
Saw Filers, Reading	...	dts 48 1/2
"Cowell Brand" Veneer	...	dts 25
Richardson's Vice and Anvil	...	dts 32 1/2
Washer Cutters		
Smith's Patent	3/4 doz \$12.00	dts 206 1/2 to 10
Johnson's	3/4 doz \$11.00	dts 206 1/2 to 10
Penny's	3/4 doz Pol. \$14; Jap'd, \$16	dts 60
Appleton's	3/4 doz \$10.00	dts 60 1/2 to 10
Bonney's	3/4 doz \$10.00	dts 60 1/2 to 10
Washers —See Nuts and Washers		
Well Wheels —8 in., \$1.85; 10 in., \$2.15; 12 in., \$2.90		
Wire		
Brass and Copper, new list, Jan. 18, '84	...	dts 306 1/2 to 5
Market, Bright and Annealed, Nos. 10 to 18	7506 7506 7506 5	dts 306 1/2 to 5
Market, Bright and Annealed, Nos. 19 to 26	...	dts 306 1/2 to 5
Market, Galvanized	...	dts 906 1/2 to 5
Market, Tinned, Tinned list	...	dts 906 1/2 to 5
Stout, Bright and Annealed, Nos. 10 to 26	...	dts 306 1/2 to 5
Stone, Bright and Annealed, Nos. 27 to 30	7506 7506 7506 5	dts 306 1/2 to 5
Stone, Galvanized, Nos. 10 to 30	...	dts 5506 5506 5
Stone, Tinned, Tinned list	...	dts 906 1/2 to 5
Tinned Broom Wire	...	dts 606 1/2 to 5
Cast Steel Wire	...	dts 5506 5506 5
Annealed Fence, Nos. 8 & 9	...	dts 706 708 5
Annealed Fence, Nos. 10 to 14	...	dts 706 708 5
Fence Staples	...	3/4 doz \$3 1/2 to 5 1/2
Fence Staples, Galvanized	...	3/4 doz \$3 1/2 to 5 1/2
Stout, Bright Wire	...	See Trade Report
Barb Wire Safety Guards	1000 \$9.00	dts 25 1/2
Stout, Bright Wire	...	dts 25 1/2
Steel Muscle Wire, Nos. 7 to 30	...	dts 25 1/2
Picture Wire	...	dts 60 1/2 to 5
Wire Cloth, Green, Draw Lines	...	dts 25 1/2
Wire Cloth, Light, Draw Black	100 sq. ft.	dts 25 1/2
Wrenches —American Adjustable		
Smith's Adjustable "S"	...	dts 45
Saxter's	...	dts 33 1/2
Cow's Genuine	cash in 10 days	dts 90 1/2
Cow's Patent, Chicago	...	dts 90 1/2
Cow's Patent, Malleable	...	dts 90 1/2
Cow's Pattern, Wrought	...	dts 75 1/2 to 6 75 1/2 10 1/2
Grand Standard	...	dts 70 1/2
Wrench, American	...	dts 70 1/2
Bemis & Call's Patent Combination	...	dts 30 1/2
Bemis & Call's Merrick's Pattern	...	dts 35 1/2
Bemis & Call's Standard	...	dts 35 1/2
Bemis & Call's Cylinder or Gas Pipe	...	dts 30 1/2
Bemis & Call's No. 3 Pipe	...	dts 30 1/2
Wrench's Patent	...	dts 50 1/2
The Favorite Pocket (Bright)	3/4 doz \$4.00	dts 45 1/2
Webster's Patent Combination	...	dts 25 1/2
Boardman's	...	dts 25 1/2 to 10
Wrench, Ready	...	dts 25 1/2
Aligator	...	dts 40 1/2
Donohue's Engineer	...	dts 25 1/2
Arme, Bicycle	...	dts 25 1/2
Arme, Nickel	...	dts 45 1/2
Arme, Bicycle, 1 1/2 in.	...	dts 45 1/2
Winners		
Novelty, for Common Tubs, No. 2, 10 in.	...	\$3.00
Novelty, for Common Tubs, No. 3, 11 in.	...	34.50
Excelsior, for Stationary Tubs, No. 2, 10 in.	...	39.00
Excelsior, for Stationary Tubs, No. F, 11 in.	...	43.50
Excelsior, for Stationary Tubs, No. 3, 11 in.	...	43.50
Excelsior, with Folding Bench, No. A, 11 in.	...	52.50
Excelsior, with Folding Bench, No. B, 11 in.	...	52.50
Universal, No. 2	...	26.00
Universal, No. 14	...	34.50
Universal, No. 19	...	39.00
Universal, No. 26	...	43.50
Universal, for Set Tubs, A 2 1/2	...	39.00
Universal, for Set Tubs, B 1 1/2	...	48.00
Universal, for Set Tubs, C 1 1/2	...	48.00
Adams & Co. No. 8	...	30.00
Peelers No. 24	...	30.00
Peelers No. 26	...	34.50
No. 19 Improved No. 2	...	30.00
"Metropolitan" No. 2	...	30.00
"Metropolitan" No. 2 1/2	...	30.00
Leader	...	30.00
Advance	...	30.00

IRON.
MALLEABLE.
JENNINGS' IMPROVED
JENNINGS' L.T.B.
Price Per Dozen, Net, \$3.00.
PURE TIN.

C. E. JENNINGS & CO., Sole Manufacturers. NEW YORK.

... ..

Lowett's Climax Water Filter

Jewell's Ginnax Water Filter

A GOOD, RELIABLE WATER FILTER

For \$2

FOR \$3.
The Reservoir of this Filter is Cast Iron. It

THE

We invite dealers in House Furnishing Goods, Hardware, Tinware, Crockery, &c. to consider the

JEWETT ware, tinware, crockery, &c., to consider the question of handling and pushing the sale of our new dress, cl

CLIMAX FILTER and excellent CLIMAX WATER-PROOFING

CLIMAX WATER FILTER,
the two-gallon size of which can be retailed for 25¢.

PORCELAIN

LINED the Trade a good profit. We think that dealers also earn the good-will and thanks of their customers by

plying them with an article so much needed and so in-
sought for by every person who can appreciate one of

greatest necessities and highest luxuries of life, **Cle
Pure Water**. This Filter is made of same material

Filter water. This filter is made on same general principle as our popular Filter and Cooler, the sale of which has

much the largest of any Filter ever sold in this country.

SEND FOR CATALOGUE

SEND FOR CATALOGUE.

JOHN C. JEWETT & SONS

BUFFALO, N. Y.,

Manufacturers of Refrigerators, Water Coolers, Bird Cages, &c.

Manufacturers of Refrigerators, Water Coolers, and Cages, etc.

and Delighting Materials

and Polishing Materials

Established 1863 Incorporated 1881 OFFICE

Established 1869. Incorporated 1881. THE

Largest Manufacturer
IN THE WORLD OF

IS THE WORLD OF

Nickel Anodes,
Nickel Salts

Nickel Salts,
Patent Muslin Buff



Patent Machine Gun
Polishing Lathes.



Polishing Felt,

Polishing Rouges,

Poling Composition
Walrus Leather

Walrus Leather,
Wood Emery Wheel



Wood Emery Wire
Platers' Brushes.



&c., &c., &c.

WORKS.  OFFICES.

CO., 538 to 564 W. 16th St. 36 to 40 11th Ave. NEW YORK U.S.

WHOLESALE METAL PRICES, May 20, 1885.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢ per lb; provided that no Bar Iron shall pay a less rate of duty than 85¢. Sheet, 11-10¢ to 15-10¢ per lb. Band, Hoop and Scroll, 1¢ to 1 1/4-10¢ per lb. Railroad Bars weighing more than 25 lb per yard, 7-10¢ per lb.

Standard American Pig Iron.
Foundry No. 1 X..... 17.00 @ 18.50
Foundry No. 2 X..... 17.00 @ 17.50
Gray Forge..... 16.00 @ 16.50

No. 1 Scotch Pig Iron.
Carnegie..... 19.00 @ 19.50
Collins..... 21.00 @ 21.50
Glenbrook..... 21.00 @ 21.50
Glenbrook..... 21.00 @ 21.50
Langdon..... 21.00 @ 21.50
Summerfield..... 21.00 @ 21.50
Valmellingham..... 19.00 @ 19.25
Eglington..... 18.00 @ 18.50
Clyde..... 19.00 @ 19.50

Rails.
Steel, at Eastern mills..... 26.50 @ 27.00
Old Rails, 7 1/2..... 19.50 @ 19.00

Scrap.
Wrought, per ton, from yard..... 18.50 @ 19.00

Bar Iron from Store.
Common Iron:
1/2 to 1 in. round and square..... 1 1/2 @ 1.75¢
1 to 1 1/2 in. round and square..... 1 1/2 @ 1.75¢
Refined Iron:
1/2 to 1 in. round and square..... 1 1/2 @ 2.1¢
1 to 1 1/2 in. round and square..... 1 1/2 @ 2.4¢
Rods—1/2 to 1 in. round and square..... 1 1/2 @ 2.5¢
Bands—1 to 1 1/2 in. round and square..... 1 1/2 @ 2.5¢
Burden's Best "Iron, base price..... 2.2¢
Burden's "H. B. & S." Iron, base price..... 2.5¢
Norway Nail Rods..... 5 @ 6¢

Sheet Iron from Store.
Common..... R. G.
American..... Cleaned

Nos. 10 to 16..... 3 1/2 @ 3 1/4¢
17 to 20..... 3 1/2 @ 3 1/4¢
21 to 24..... 3 1/2 @ 3 1/4¢
25 and 26..... 3 1/2 @ 3 1/4¢
27..... 3 1/2 @ 3 1/4¢
28..... 3 1/2 @ 3 1/4¢
29..... 3 1/2 @ 3 1/4¢
30..... 3 1/2 @ 3 1/4¢
31..... 3 1/2 @ 3 1/4¢
32..... 3 1/2 @ 3 1/4¢
33..... 3 1/2 @ 3 1/4¢
34..... 3 1/2 @ 3 1/4¢
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36..... 3 1/2 @ 3 1/4¢
37..... 3 1/2 @ 3 1/4¢
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82..... 3 1/2 @ 3 1/4¢
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86..... 3 1/2 @ 3 1/4¢
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89..... 3 1/2 @ 3 1/4¢
90..... 3 1/2 @ 3 1/4¢
91..... 3 1/2 @ 3 1/4¢
92..... 3 1/2 @ 3 1/4¢
93..... 3 1/2 @ 3 1/4¢
94..... 3 1/2 @ 3 1/4¢
95..... 3 1/2 @ 3 1/4¢
96..... 3 1/2 @ 3 1/4¢
97..... 3 1/2 @ 3 1/4¢
98..... 3 1/2 @ 3 1/4¢
99..... 3 1/2 @ 3 1/4¢
100..... 3 1/2 @ 3 1/4¢

Iron Wire. See Wire.

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb, 25¢ ad. val.; valued above 7¢ and not above 10¢ per lb, 25¢ ad. val.; valued above 10¢ per lb, 34¢ ad. val. Extra—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1 1/4¢ in addition to above. Steel Circular Saw Plates, 1¢ in addition to the above.

American Cast Steel.
For American Steel, see Pittsburgh quotations.

English Steel.
Best Cast..... 15 1/2 @ 15 1/4¢
Extra Cast..... 16 1/2 @ 16 1/4¢
Circular Saw Plates..... 17 1/2 @ 17 1/4¢
Round Machinery Cast..... 18 1/2 @ 18 1/4¢
Swaged Cast..... 19 1/2 @ 19 1/4¢
Best Double Sheet..... 20 1/2 @ 20 1/4¢
Riveter, 1st quality..... 21 1/2 @ 21 1/4¢
Gilder, 1st quality..... 22 1/2 @ 22 1/4¢
Sheet Cast Steel, 1st quality..... 23 1/2 @ 23 1/4¢
2d quality..... 24 1/2 @ 24 1/4¢
3d quality..... 25 1/2 @ 25 1/4¢
4th quality..... 26 1/2 @ 26 1/4¢
5th quality..... 27 1/2 @ 27 1/4¢
6th quality..... 28 1/2 @ 28 1/4¢
7th quality..... 29 1/2 @ 29 1/4¢
8th quality..... 30 1/2 @ 30 1/4¢
9th quality..... 31 1/2 @ 31 1/4¢
10th quality..... 32 1/2 @ 32 1/4¢
11th quality..... 33 1/2 @ 33 1/4¢
12th quality..... 34 1/2 @ 34 1/4¢
13th quality..... 35 1/2 @ 35 1/4¢
14th quality..... 36 1/2 @ 36 1/4¢
15th quality..... 37 1/2 @ 37 1/4¢
16th quality..... 38 1/2 @ 38 1/4¢
17th quality..... 39 1/2 @ 39 1/4¢
18th quality..... 40 1/2 @ 40 1/4¢
19th quality..... 41 1/2 @ 41 1/4¢
20th quality..... 42 1/2 @ 42 1/4¢
21st quality..... 43 1/2 @ 43 1/4¢
22nd quality..... 44 1/2 @ 44 1/4¢
23rd quality..... 45 1/2 @ 45 1/4¢
24th quality..... 46 1/2 @ 46 1/4¢
25th quality..... 47 1/2 @ 47 1/4¢
26th quality..... 48 1/2 @ 48 1/4¢
27th quality..... 49 1/2 @ 49 1/4¢
28th quality..... 50 1/2 @ 50 1/4¢
29th quality..... 51 1/2 @ 51 1/4¢
30th quality..... 52 1/2 @ 52 1/4¢
31st quality..... 53 1/2 @ 53 1/4¢
32nd quality..... 54 1/2 @ 54 1/4¢
33rd quality..... 55 1/2 @ 55 1/4¢
34th quality..... 56 1/2 @ 56 1/4¢
35th quality..... 57 1/2 @ 57 1/4¢
36th quality..... 58 1/2 @ 58 1/4¢
37th quality..... 59 1/2 @ 59 1/4¢
38th quality..... 60 1/2 @ 60 1/4¢
39th quality..... 61 1/2 @ 61 1/4¢
40th quality..... 62 1/2 @ 62 1/4¢
41st quality..... 63 1/2 @ 63 1/4¢
42nd quality..... 64 1/2 @ 64 1/4¢
43rd quality..... 65 1/2 @ 65 1/4¢
44th quality..... 66 1/2 @ 66 1/4¢
45th quality..... 67 1/2 @ 67 1/4¢
46th quality..... 68 1/2 @ 68 1/4¢
47th quality..... 69 1/2 @ 69 1/4¢
48th quality..... 70 1/2 @ 70 1/4¢
49th quality..... 71 1/2 @ 71 1/4¢
50th quality..... 72 1/2 @ 72 1/4¢
51st quality..... 73 1/2 @ 73 1/4¢
52nd quality..... 74 1/2 @ 74 1/4¢
53rd quality..... 75 1/2 @ 75 1/4¢
54th quality..... 76 1/2 @ 76 1/4¢
55th quality..... 77 1/2 @ 77 1/4¢
56th quality..... 78 1/2 @ 78 1/4¢
57th quality..... 79 1/2 @ 79 1/4¢
58th quality..... 80 1/2 @ 80 1/4¢
59th quality..... 81 1/2 @ 81 1/4¢
60th quality..... 82 1/2 @ 82 1/4¢
61st quality..... 83 1/2 @ 83 1/4¢
62nd quality..... 84 1/2 @ 84 1/4¢
63rd quality..... 85 1/2 @ 85 1/4¢
64th quality..... 86 1/2 @ 86 1/4¢
65th quality..... 87 1/2 @ 87 1/4¢
66th quality..... 88 1/2 @ 88 1/4¢
67th quality..... 89 1/2 @ 89 1/4¢
68th quality..... 90 1/2 @ 90 1/4¢
69th quality..... 91 1/2 @ 91 1/4¢
70th quality..... 92 1/2 @ 92 1/4¢
71st quality..... 93 1/2 @ 93 1/4¢
72nd quality..... 94 1/2 @ 94 1/4¢
73rd quality..... 95 1/2 @ 95 1/4¢
74th quality..... 96 1/2 @ 96 1/4¢
75th quality..... 97 1/2 @ 97 1/4¢
76th quality..... 98 1/2 @ 98 1/4¢
77th quality..... 99 1/2 @ 99 1/4¢
78th quality..... 100 1/2 @ 100 1/4¢
79th quality..... 101 1/2 @ 101 1/4¢
80th quality..... 102 1/2 @ 102 1/4¢
81st quality..... 103 1/2 @ 103 1/4¢
82nd quality..... 104 1/2 @ 104 1/4¢
83rd quality..... 105 1/2 @ 105 1/4¢
84th quality..... 106 1/2 @ 106 1/4¢
85th quality..... 107 1/2 @ 107 1/4¢
86th quality..... 108 1/2 @ 108 1/4¢
87th quality..... 109 1/2 @ 109 1/4¢
88th quality..... 110 1/2 @ 110 1/4¢
89th quality..... 111 1/2 @ 111 1/4¢
90th quality..... 112 1/2 @ 112 1/4¢
91st quality..... 113 1/2 @ 113 1/4¢
92nd quality..... 114 1/2 @ 114 1/4¢
93rd quality..... 115 1/2 @ 115 1/4¢
94th quality..... 116 1/2 @ 116 1/4¢
95th quality..... 117 1/2 @ 117 1/4¢
96th quality..... 118 1/2 @ 118 1/4¢
97th quality..... 119 1/2 @ 119 1/4¢
98th quality..... 120 1/2 @ 120 1/4¢
99th quality..... 121 1/2 @ 121 1/4¢
100th quality..... 122 1/2 @ 122 1/4¢

Steel Wire. See Wire.

Brass and Copper Wire.
Old English Gauge the Standard.—Dis 20 @ 30

Common High Brass.
All Nos. to No. 16..... 20 @ 20¢
No. 17 and 18..... 21 @ 21¢
No. 19 and 20..... 22 @ 22¢
No. 21 and 22..... 23 @ 23¢
No. 23 and 24..... 24 @ 24¢
No. 25 and 26..... 25 @ 25¢
No. 27 and 28..... 26 @ 26¢
No. 29 and 30..... 27 @ 27¢
No. 31 and 32..... 28 @ 28¢
No. 33 and 34..... 29 @ 29¢
No. 35 and 36..... 30 @ 30¢
No. 37 and 38..... 31 @ 31¢
No. 39 and 40..... 32 @ 32¢
No. 41 and 42..... 33 @ 33¢
No. 43 and 44..... 34 @ 34¢
No. 45 and 46..... 35 @ 35¢
No. 47 and 48..... 36 @ 36¢
No. 49 and 50..... 37 @ 37¢
No. 51 and 52..... 38 @ 38¢
No. 53 and 54..... 39 @ 39¢
No. 55 and 56..... 40 @ 40¢
No. 57 and 58..... 41 @ 41¢
No. 59 and 60..... 42 @ 42¢
No. 61 and 62..... 43 @ 43¢
No. 63 and 64..... 44 @ 44¢
No. 65 and 66..... 45 @ 45¢
No. 67 and 68..... 46 @ 46¢
No. 69 and 70..... 47 @ 47¢
No. 71 and 72..... 48 @ 48¢
No. 73 and 74..... 49 @ 49¢
No. 75 and 76..... 50 @ 50¢
No. 77 and 78..... 51 @ 51¢
No. 79 and 80..... 52 @ 52¢
No. 81 and 82..... 53 @ 53¢
No. 83 and 84..... 54 @ 54¢
No. 85 and 86..... 55 @ 55¢
No. 87 and 88..... 56 @ 56¢
No. 89 and 90..... 57 @ 57¢
No. 91 and 92..... 58 @ 58¢
No. 93 and 94..... 59 @ 59¢
No. 95 and 96..... 60 @ 60¢
No. 97 and 98..... 61 @ 61¢
No. 99 and 100..... 62 @ 62¢

Low Brass.
All Nos. to No. 16..... 20 @ 20¢
No. 17 and 18..... 21 @ 21¢
No. 19 and 20..... 22 @ 22¢
No. 21 and 22..... 23 @ 23¢
No. 23 and 24..... 24 @ 24¢
No. 25 and 26..... 25 @ 25¢
No. 27 and 28..... 26 @ 26¢
No. 29 and 30..... 27 @ 27¢
No. 31 and 32..... 28 @ 28¢
No. 33 and 34..... 29 @ 29¢
No. 35 and 36..... 30 @ 30¢
No. 37 and 38..... 31 @ 31¢
No. 39 and 40..... 32 @ 32¢
No. 41 and 42..... 33 @ 33¢
No. 43 and 44..... 34 @ 34¢
No. 45 and 46..... 35 @ 35¢
No. 47 and 48..... 36 @ 36¢
No. 49 and 50..... 37 @ 37¢
No. 51 and 52..... 38 @ 38¢
No. 53 and 54..... 39 @ 39¢
No. 55 and 56..... 40 @ 40¢
No. 57 and 58..... 41 @ 41¢
No. 59 and 60..... 42 @ 42¢
No. 61 and 62..... 43 @ 43¢
No. 63 and 64..... 44 @ 44¢
No. 65 and 66..... 45 @ 45¢
No. 67 and 68..... 46 @ 46¢
No. 69 and 70..... 47 @ 47¢
No. 71 and 72..... 48 @ 48¢
No. 73 and 74..... 49 @ 49¢
No. 75 and 76..... 50 @ 50¢
No. 77 and 78..... 51 @ 51¢
No. 79 and 80..... 52 @ 52¢
No. 81 and 82..... 53 @ 53¢
No. 83 and 84..... 54 @ 54¢
No. 85 and 86..... 55 @ 55¢
No. 87 and 88..... 56 @ 56¢
No. 89 and 90..... 57 @ 57¢
No. 91 and 92..... 58 @ 58¢
No. 93 and 94..... 59 @ 59¢
No. 95 and 96..... 60 @ 60¢
No. 97 and 98..... 61 @ 61¢
No. 99 and 100..... 62 @ 62¢

Copper.
All Nos. to No. 16..... 20 @ 20¢
No. 17 and 18..... 21 @ 21¢
No. 19 and 20..... 22 @ 22¢
No. 21 and 22..... 23 @ 23¢
No. 23 and 24..... 24 @ 24¢
No. 25 and 26..... 25 @ 25¢
No. 27 and 28..... 26 @ 26¢
No. 29 and 30..... 27 @ 27¢
No. 31 and 32..... 28 @ 28¢
No. 33 and 34..... 29 @ 29¢
No. 35 and 36..... 30 @ 30¢
No. 37 and 38..... 31 @ 31¢
No. 39 and 40..... 32 @ 32¢
No. 41 and 42..... 33 @ 33¢
No. 43 and 44..... 34 @ 34¢
No. 45 and 46..... 35 @ 35¢
No. 47 and 48..... 36 @ 36¢
No. 49 and 50..... 37 @ 37¢
No. 51 and 52..... 38 @ 38¢
No. 53 and 54..... 39 @ 39¢
No. 55 and 56..... 40 @ 40¢
No. 57 and 58..... 41 @ 41¢
No. 59 and 60..... 42 @ 42¢
No. 61 and 62..... 43 @ 43¢
No. 63 and 64..... 44 @ 44¢
No. 65 and 66..... 45 @ 45¢
No. 67 and 68..... 46 @ 46¢
No. 69 and 70..... 47 @ 47¢
No. 71 and 72..... 48 @ 48¢
No. 73 and 74..... 49 @ 49¢
No. 75 and 76..... 50 @ 50¢
No. 77 and 78..... 51 @ 51¢
No. 79 and 80..... 52 @ 52¢
No. 81 and 82..... 53 @ 53¢
No. 83 and 84..... 54 @ 54¢
No. 85 and 86..... 55 @ 55¢
No. 87 and 88..... 56 @ 56¢
No. 89 and 90..... 57 @ 57¢
No. 91 and 92..... 58 @ 58¢
No. 93 and 94..... 59 @ 59¢
No. 95 and 96..... 60 @ 60¢
No. 97 and 98..... 61 @ 61¢
No. 99 and 100..... 62 @ 62¢

Iron Wire. See Wire.

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb, 25¢ ad. val.; valued above 7¢ and not above 10¢ per lb, 25¢ ad. val.; valued above 10¢ per lb, 34¢ ad. val. Extra—Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 1 1/4¢ in addition to above. Steel Circular Saw Plates, 1¢ in addition to the above.

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For American Steel, see Pittsburgh quotations.

English Steel.
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Round Machinery Cast..... 18 1/2 @ 18 1/4¢
Swaged Cast..... 19 1/2 @ 19 1/4¢
Best Double Sheet..... 20 1/2 @ 20 1/4¢
Riveter, 1st quality..... 21 1/2 @ 21 1/4¢
Gilder, 1st quality..... 22 1/2 @ 22 1/4¢
Sheet Cast Steel, 1st quality..... 23 1/2 @ 23 1/4¢
2d quality..... 24 1/2 @ 24 1/4¢
3d quality..... 25 1/2 @ 25 1/4¢
4th quality..... 26 1/2 @ 26 1/4¢
5th quality..... 27 1/2 @ 27 1/4¢
6th quality..... 28 1/2 @ 28 1/4¢
7th quality..... 29 1/2 @ 29 1/4¢
8th quality..... 30 1/2 @ 30 1/4¢
9th quality..... 31 1/2 @ 31 1/4¢
10th quality..... 32 1/2 @ 32 1/4¢
11th quality..... 33 1/2 @ 33 1/4¢
12th quality..... 34 1/2 @ 34 1/4¢
13th quality..... 35 1/2 @ 35 1/4¢
14th quality..... 36 1/2 @ 36 1/4¢
15th quality..... 37 1/2 @ 37 1/4¢
16th quality..... 38 1/2 @ 38 1/4¢
17th quality..... 39 1/2 @ 39 1/4¢
18th quality..... 40 1/2 @ 40 1/4¢
19th quality..... 41 1/2 @ 41 1/4¢
20th quality..... 42 1/2 @ 42 1/4¢
21st quality..... 43 1/2 @ 43 1/4¢
22nd quality..... 44 1/2 @ 44 1/4¢
23rd quality..... 45 1/2 @ 45 1/4¢
24th quality..... 46 1/2 @ 46 1/4¢
25th quality..... 47 1/2 @ 47 1/4¢
26th quality..... 48 1/2 @ 48 1/4¢
27th quality..... 49 1/2 @ 49 1/4¢
28th quality..... 50 1/2 @ 50 1/4¢
29th quality..... 51 1/2 @ 51 1/4¢
30th quality..... 52 1/2 @ 52 1/4¢
31st quality..... 53 1/2 @ 53 1/4¢
32nd quality..... 54 1/2 @ 54 1/4¢
33rd quality..... 55 1/2 @ 55 1/4¢
34th quality..... 56 1/2 @ 56 1/4¢
35th quality..... 57 1/2 @ 57 1/4¢
36th quality..... 58 1/2 @ 58 1/4¢
37th quality..... 59 1/2 @ 59 1/4¢
38th quality..... 60 1/2 @ 60 1/4¢
39th quality..... 61 1/2 @ 61 1/4¢
40th quality..... 62 1/2 @ 62 1/4¢
41st quality..... 63 1/2 @ 63 1/4¢
42nd quality..... 64 1/2 @ 64 1/4¢
43rd quality..... 65 1/2 @ 65 1/4¢
44th quality..... 66 1/2 @ 66 1/4¢
45th quality..... 67 1/2 @ 67 1/4¢
46th quality..... 68 1/2 @ 68 1/4¢
47th quality..... 69 1/2 @ 69 1/4¢
48th quality..... 70 1/2 @ 70 1/4¢
49th quality..... 71 1/2 @ 71 1/4¢
50th quality..... 72 1/2 @ 72 1/4¢
51st quality..... 73 1/2 @ 73 1/4¢
52nd quality..... 74 1/2 @ 74 1/4¢
53rd quality..... 75 1/2 @ 75 1/4¢
54th quality..... 76 1/2 @ 76 1/4¢
55th quality..... 77 1/2 @ 77 1/4¢
56th quality..... 78 1/2 @ 78 1/4¢
57th quality..... 79 1/2 @ 79 1/4¢
58th quality..... 80 1/2 @ 80 1/4¢
59th quality..... 81 1/2 @ 81 1/4¢
60th quality..... 82 1/2 @ 82 1/4¢
61st quality..... 83 1/2 @ 83 1/4¢
62nd quality..... 84 1/2 @ 84 1/4¢
63rd quality..... 85 1/2 @ 85 1/4¢
64th quality..... 86 1/2 @ 86 1/4¢
65th quality..... 87 1/2 @ 87 1/4¢
66th quality..... 88 1/2 @ 88 1/4¢
67th quality..... 89 1/2 @ 89 1/4¢
68th quality..... 90 1/2 @ 90 1/4¢
69th quality..... 91 1/2 @ 91 1/4¢
70th quality..... 92 1/2 @ 92 1/4¢
71st quality..... 93 1/2 @ 93 1/4¢
72nd quality..... 94 1/2 @ 94 1/4¢
73rd quality..... 95 1/2 @ 95 1/4¢
74th quality..... 96 1/2 @ 96 1/4¢
75th quality..... 97 1/2 @ 97 1/4¢
76th quality..... 98 1/2 @ 98 1/4¢
77th quality..... 99 1/2 @ 99 1/4¢
78th quality..... 100 1/2 @ 100 1/4¢
79th quality..... 101 1/2 @ 101 1/4¢
80th quality..... 102 1/2 @ 102 1/4¢
81st quality..... 103 1/2 @ 103 1/4¢
82nd quality..... 104 1/2 @ 104 1/4¢
83rd quality..... 105 1/2 @ 105 1/4¢
84th quality..... 106 1/2 @ 106 1/4¢
85th quality..... 107 1/2 @ 107 1/4¢
86th quality..... 108 1/2 @ 108 1/4¢
87th quality..... 109 1/2 @ 109 1/4¢
88th quality..... 110 1/2 @ 110 1/4¢
89th quality..... 111 1/2 @ 111 1/4¢
90th quality..... 112 1/2 @ 112 1/4¢
91st quality..... 113 1/2 @ 113 1/4¢
92nd quality..... 114 1/2 @ 114 1/4¢
93rd quality..... 115 1/2 @ 115 1/4¢
94th quality..... 116 1/2 @ 116 1/4¢
95th quality..... 117 1/2 @ 117 1/4¢
96th quality..... 118 1/2 @ 118 1/4¢
97th quality..... 119 1/2 @ 119 1/4¢
98th quality..... 120 1/2 @ 120 1/4¢
99th quality..... 121 1/2 @ 121 1/4¢
100th quality..... 122 1/2 @ 122 1/4¢

Steel Wire. See Wire.

Brass and Copper Wire.
Old English Gauge the Standard.—Dis 20 @ 30

Common High Brass.
All Nos. to No. 16..... 20 @ 20¢
No. 17 and 18..... 21 @ 21¢
No. 19 and 20..... 22 @ 22¢
No. 21 and 22..... 23 @ 23¢
No. 23 and 24..... 24 @ 24¢
No. 25 and 26..... 25 @ 25¢
No. 27 and 28..... 26 @ 26¢
No. 29 and 30..... 27 @ 27¢
No. 31 and 32..... 28 @ 28¢
No. 33 and 34..... 29 @ 29¢
No. 35 and 36..... 30 @ 30¢
No. 37 and 38..... 31 @ 31¢
No. 39 and 40..... 32 @ 32¢
No. 41 and 42..... 33 @ 33¢
No. 43 and 44..... 34 @ 34¢
No. 45 and 46..... 35 @ 35¢
No. 47 and 48..... 36 @ 36¢
No. 49 and 50..... 37 @ 37¢
No. 51 and 52..... 38 @ 38¢
No. 53 and 54..... 39 @ 39¢
No. 55 and 56..... 40 @ 40¢
No. 57 and 58..... 41 @ 41¢
No. 59 and 60..... 42 @ 42¢
No. 61 and 62..... 43 @ 43¢
No. 63 and 64..... 44 @ 44¢
No. 65 and 66..... 45 @ 45¢

Foreign Markets.

FRANCE.

PARIS, May 5, 1885.—*Metals*.—The fear about war having disappeared, there is a better tone in business generally and in Metals in particular. Without so far leading to any material advance in prices. Copper is lower than it was the previous week. We quote: Chili Bars, 112.50 @ 115; Ingots and Slabs, 120; Best Selected, 125, and Pure Corocoro Ore, 115. Tin is slightly higher. We quote: Banca, 225; Billiton 230; Straits and Australian, 217.50, and English, 216.50. Lead is better—37.25 @ 38.35, and Spelter sustained—36.75 @ 37.50. Iron.—There is an improved feeling now that uneasiness about the future has been allayed. Even before the favorable change took place iron merchants in this city made an attempt to advance the price of iron, in view of the good building demand in prospect, but the movement proved abortive, because premature. It may, if repeated, have better success now. Merchant iron has, meanwhile, been steady at 14; Charcoal Coke do. at 24; Sheets, 20 @ 25, and Wire Nails, No. 18, in bulk, 37. More favorable news reaches us from the Haute-Marne, where Coke Merchant is bringing 14.50 @ 15, and Mixed, 16 @ 16.50. The Champagne rolling mills have received a large Cochinese order for iron, beating their English competitors. They quote: Wire Nails, No. 18, 35 @ 36 francs. In the Loire Basin matters are still unsatisfactory and critical. In the northern districts the demand is not bad, but far from being up to the capacity of production. They quote Merchant 13.50 @ 14, and in the Ardennes 14 for No 2. Coal is moderately active and steady.—*Moniteur des Intérêts Matériels*.

BELGIUM.

BRUSSELS, May 5, 1885.—*Iron*.—While the war excitement lasted the demand, especially for shipment to the East, fell off materially, causing partial stagnation in the iron trade. The at present more peaceful outlook causes a partial revival. There is now a good demand for structural iron in particular, whereas all pig iron remains neglected and dull. Meanwhile hopes and expectations center on the proposed building of branch railways. We quote toward the close: English Pig, 4.85; Luxembourg, 5; Charleroi, 6.75; Pudding Pig, 4 @ 4.80; Merchant No. 1, 11 @ 11.25; No. 2, 11.75; No. 3, 12.50; Beams, 11.50 @ 12; Angles, 12 @ 13.25; Sheet, 14 @ 16.25. Coal.—While Domestic Coal is dull, Machine Coal begins to be dealt in more actively.—*Moniteur Industriel*.

GERMANY.

HAMBURG, May 5, 1885.—*Iron*.—Our Dortmund correspondent writes that during the week the iron situation in Rhenish-Westphalia has neither got to be worse, nor has it improved. Rolling-mill owners are endeavoring to arrive at a combination with Upper Silesians. Meanwhile, iron ore has been depressed in Silesia by the competition of Spanish, now arriving at very low freights. Pig iron remains depressed. There is a tolerably steady current of orders for Merchant iron, but all the demand is for immediate delivery and there is a general desire to have the output curtailed. There is no improved demand yet for Sheet Iron. Thin Sheets are even more depressed than Coarse. Wire is neglected, yet prices are sustained. Steel works continue doing well; orders from domestic railroads are also on the increase. This may also be said of locomotive and car works; they are steadily in receipt of domestic orders. Machine shops and foundries are still tolerably busy, but no fresh orders make their appearance. Prices are so low that there is hardly any margin. Boiler-makers and bridge-building concerns are not fully employed. They quote White Pig, 46 @ 47; Spiegel, 48 @ 49; Merchant, 108 @ 130; Sheets, 115 @ 145; Steel Rails, 130 @ 146; do. for mines, 108 @ 115 marks @ ton. Coal.—There is a plan on foot to form a syndicate. Metals.—Lead has been looking up, but Copper is weaker. We quote German Lead, 11.50 @ 12.50 marks @ 50 kg.; Copper, Lake Superior, 53 @ 56; Tin, 86 @ 90, and Spelter, 13.80 @ 14, spot; to arrive, 13.90 @ 13.80.—*Borsenhalle*.

AUSTRIA.

VIENNA, May 3, 1885.—*Iron*.—The excessive heat during the latter half of April and drought having caused apprehensions about the growing crops. Business in general has been very dull and in iron and Metals in particular. To some extent the quiet and apathy were due also to the war panic and the unsatisfactory balance sheets of Austrian companies on shares. Still the activity in the manufacture of Steel Rails and Railroad Material steadies prices. We quote: Pig, 47 @ 56; Merchant, 105 @ 130; Sheets, 170 @ 190, and Beams, 105 @ 115 florins @ ton.—*Austrian Trade Journal*.

HOLLAND.

ROTTERDAM, May 2, 1885.—*Tin*.—The market has become more active, with a rising tendency. Banca, spot, commanding 48.50; May sale, 48.75; Billiton, spot, 48.25; June, 48.50, and August, 48.75. Stock of Tin in Holland, 56,704 slabs, against 71,301 in 1884, and 99,573 in 1883; deliveries since January 1, 60,035, against 80,905 in 1884, and 72,914 in 1883. Price of Banca, 48.75, against 53.50 in 1884, and 59.25 in 1883.—*Koch & Vlierboom*.

SPAIN.

MADRID, May 5, 1885.—*Metals*.—The customary returns for the first two months show the following exports:

	1883.	1884.	1885.
Tons.	Tons.	Tons.	
Calamine.....	1,800	4,402	10,049
Pyrites.....	101,061	97,569	123,149
Iron Ore.....	806,650	796,032	722,518
Ingots Copper.....	4,363	2,449	3,268
Quicksilver.....	121	570	423
Pig Lead.....	20,425	21,136	30,707
Total.....	934,321	921,108	880,134

The total amount of sales made by the Rio Tinto Copper Company in 1884 was 2576,085, and the gross profit £210,813, against £152,039 in 1883. After setting aside toward the sinking fund, £234,553, the net profit is £274,142, against £459,078 in 1883, and the dividend declared 8 s. against 14 s. in 1883. The mines and railway figure on the books of the company with £4,580,000.—*Revista Minera*.

AUSTRALIA.

SYDNEY, N. S. W., April 24, 1885.—*Iron*.—The market is quiet and nominally unchanged, but essentially weak at 211. 7/6 for Fence Wire No. 8, and 230 for Galvanized Iron.—*Per cable via London*.

EAST INDIES.

BATAVIA, April 29, 1885.—*Tin*.—The sale of about 10,000 piculs Billiton today averaged 54.35 guilders @ picul.—*Per cable via Holland*.

CHILI.

VALPARAISO, March 20, 1885.—*Copper*.—The decline in London and rise in exchange here caused a drooping market here, with sales of 8000 quintals at 517, which is equal to £43. 10/ in England. *Nitrates*.—The improvement abroad, supposed to be stimulated by the more favorable statistical position on this coast, has revived the export demand. 353,500 quintals selling at \$2.77 1/2 @ \$2.80, 95 s. which is equal to 8/10 in England. More would have been done but for the lack of available tonnage and rise in exchange. Shipments during the first two months:

	1883.	1884.	1885.
	Quintals.	Quintals.	Quintals.
England and North			
of Europe.	1,296,024	1,296,955	890,196
The Mediterranean	67,851	87,433	14,282
The United States..	322,521	408,296	236,022
Total.....	1,686,396	1,812,674	1,080,490

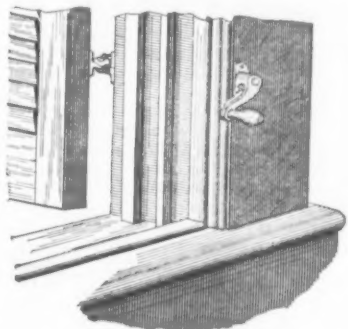
On the 1st inst. there were loading 561,180 quintals, of which 428,380 were for Europe and 132,800 for the United States. Charters during the fortnight have been 12,900 tons for Europe and 1000 for the United States. Coal strong, little being shipped this way. February shipment, Newcastle and West Hartley, 32, paid. Exchange, 90 days' sight, 26.—*Weber & Co.*

During the month of April last the Patent Office received 3159 new applications for patents, the fees upon which aggregated \$100,000, and yet Congress refuses, session after session, to grant a sufficient appropriation to employ a large enough clerical force to keep up the business of the office. This is the largest sum in fees yet received by the Patent Office, the nearest approach to it being in the month of March, 1883, when the fees footed up \$99,515.

HARDWARE NOVELTIES.

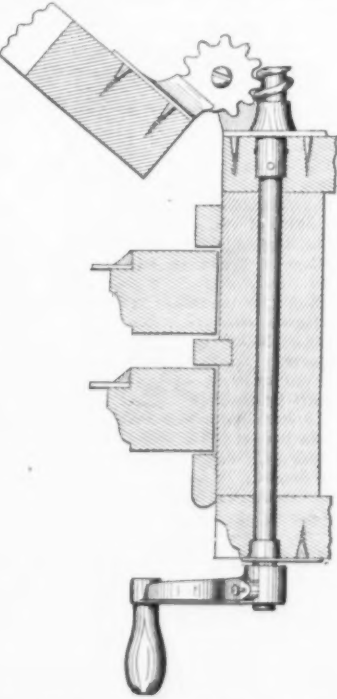
Window-Blind Worker.

A. H. Dodd, of Hudson, N. Y., is now introducing a window-blind worker which he calls the "Little Gem," views of which are afforded in the engravings shown below. The second cut shows a horizontal sectional view through a window casing, indicating the position of the sash, and showing the worker in place, with the blind partly closed or bowed. It will be seen that the fixture consists of a shaft of sufficient length to pass through the wall of the house, and that the lower hinge of the blind is arranged in the form of a pinion; a worm on the outer end of



The "Little Gem" Window-Blind Worker.

the shaft engages with this pinion, and the shaft being revolved by movement of the crank, which projects into the room, the shutter is opened or closed as may be desired. The general appearance of the fixture from the inside is indicated in the first cut. By the construction and arrangement of parts embodied in this device no special fastening upon the shutter is required, either for holding it shut or keeping it wide open. At the same time the shutter is equally well fastened at any intermediate point. The advantages to the householder, since it saves the raising of windows, avoids wet arms and



Horizontal Section Through Window, Showing Construction and Operation of the Blind Worker.

sleeves in stormy weather, and successfully avoids the nuisance of slamming blinds in wind storms, are too apparent to need enumeration. The maker asserts that this fixture will fit any blind, and that it can be used in combination with any upper hinge that may be in use. For the purpose of very generally introducing these goods the maker has arranged to send sample sets by mail.

The "Lightning" Copying Press.

The cut below illustrates the "Lightning" Copying Press, manufactured by Mr. R. E. Kidder, 23 Hermon street, Worcester, Mass. The merits claimed for the press are swiftness and accuracy, combined with lightness and convenience in use. The press consists of an iron frame, to the top of which is secured a bed-plate. Below the bed-plate is the movable platen, which has at each end a guiding post that passes through an aperture in the bed-plate. The upper end of the posts are screw-threaded and carry adjustable



The "Lightning" Copying Press.

ble nuts. Above the bed-plate are two levers, fulcrumed near the edges of the plate, and with the outer ends bearing on the under surfaces of the adjusting nuts, as shown in the cut. The levers, which overlap at the center of the plate, pass under a cam rotated by a handle. Having regulated the adjustable nuts to the proper height to receive the copying-book, which is inserted between the platen and the bed-plate, the lever is pressed to the right, as shown in the cut. By so doing the cam is rotated and the inner ends of the levers forced down and the outer ends elevated in consequence, which raise the guiding posts, and with them the platen, thus submitting the copying-book to the necessary pressure. It is readily seen

that by turning the handle in the opposite direction the platen is lowered and the book released. These copying presses are made in three styles, A, B and C respectively, and each style comprises three or four different sizes. They are finished in japan, bronze, gold, nickel-plate, &c.

The "Little Jewel" Door Check and Bumper.

The Teetzel Mfg. Co., Detroit, Mich., are the makers of the "Little Jewel" Door Check and Bumper, a general view of which article is shown in the cut. Its construction is so simple that but little description is called for. The bumper is attached by screwing the base plate to the door at a distance of 1 1/4 inches from the floor. The small knob seen at the end is of rubber, which, when the bumper is in the position seen in the cut, acts as a check to prevent the door

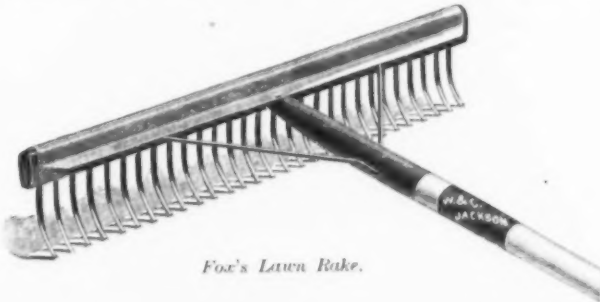


The "Little Jewel" Door Check and Bumper.

from moving either way. Within the bumper is a spring that presses a catch into a slot in the base, there being a slot at the lower side and another at right angles to it. The catch is freed by pressing down the knob shown at the left in the cut. When used as a bumper or door stop the catch is released from the slot and the movable part rotated until it stands at right angles with the door, in which position the catch engages in the second notch and holds the bar from moving. The bumper, which is made of brass, nickel-plated, is carefully finished and appears to be strong and durable.

Fox's Lawn Rake.

This article, the appearance of which is shown in the accompanying illustration, is put on the market by the Withington &



Fox's Lawn Rake.

Cooley Mfg. Co., Jackson, Mich. It will be seen that a sharp bend is given to the teeth, which are made of steel, so that they may run over the ground something in the way in which the teeth of a wheel horse rake do, without sticking into the sod. It will be seen also that they are very much closer together than in ordinary rakes, this article having 29 teeth. Thus constructed, it is claimed that the Rake will gather the fine clippings or leaves from the lawn much better than other rakes. If the teeth should become clogged, one motion backward is claimed to clear them perfectly from leaves, grass or chips. The teeth are inserted, it will be seen, as indicated in the cut, in a wood head, over which there is a metallic shield, the head also having metallic braces to give the requisite strength. In this connection we may add that a number of specialties for the lawn are made by this company, among which may be mentioned thistle or weed cutters, handled, with or without foot rest, which are used for cutting thistles, plantain or other weeds from lawns or gardens; also turf edgers for trimming the edge of grass, borders, walks, &c., as well as a variety of rakes.

Cabinet-Maker's Clamp.

The cuts below illustrate a Cabinet-Maker's Clamp made by the Cincinnati Tool Company, 216 to 220 West Second street,



Fig. 1.—General View of Cabinet-Maker's Clamp.

Cincinnati, Ohio. The bar, which is 1 1/4 x 2 inches, is made of ash, as is also the handle. The screw, which is of wrought iron, is 3/4 inch in diameter and 6 inches in length, with square thread. It is driven tightly into the handle and then riveted, making it impossible, it is said, for the handle to turn on the screw. The tip of the screw, frame and slide are of jappanned gray iron. The dog on the slide is operated by a spring which prevents the slide from work-



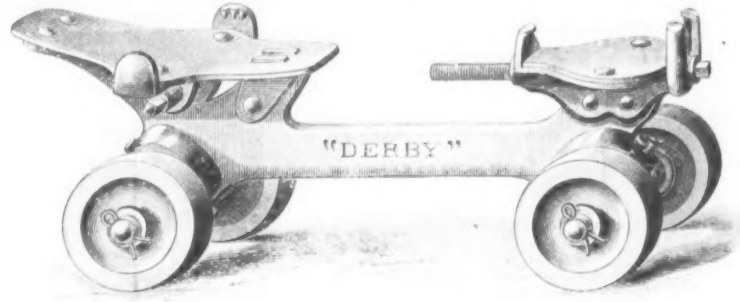
Fig. 2.—Clamp Specially Strengthened.

ing until the position of it is changed by the person using the clamp. The screw may be changed from the upper to the lower hole in the frame, as the nature of the work requires. In case it is wished to make the clamp stronger for any special work, a piece

of 3/8-inch wood of any width may be screwed to the under side of the clamp, as shown in Fig. 2. The special point of excellence claimed for this clamp is the quickness with which it can be adjusted.

The "Derby" Roller Skate.

The "Derby" Roller Skate, shown in the illustration below, is manufactured by Sise, Gibson & Co., 100 Chambers street, New York. One special feature of this skate is the manner in which the cushions are placed and held for the purpose of enabling the skater, it is said, to use the same motions as



The "Derby" Roller Skate.

an ice skater. This is produced mainly by placing the cushions immediately under the ball of the foot and center of the heel, where the whole weight of the body bears. The cushions are so shaped and placed that they form a solid rubber ball under each bearing to prevent jar, and at the same time to leave sufficient elasticity for easy action of the trucks. The skates are made in the different styles of fastenings suitable for ladies or gentlemen. Another advantage claimed for the skates is that the working parts are so constructed that a 2 1/4-inch wheel can be easily worn, and on skates Nos. 25 and 35 a 2 1/2-inch wheel can be used. The skates are simple in construction and are said to be very strong and durable.

The Coaling Stations of the World.

The completion is announced of a very important public document. It contains a chart of the world, showing all the ports at which there are coal deposits and repairing facilities, and a tabular statement showing the kind and quality of coal at each port, the cost per ton, manner of coaling (rapid or slow) and next nearest coaling port, the number and size of dry docks and machine shops at which steamers can repair. There are 17 ports on the North American lakes

soft coal amounts to more than the whole weight of the armament, or two days' coal supply at full power. He concludes therefrom that unless we use free-burning coal we shall be heavily handicapped in producing vessels to compare favorably with those built abroad.

Chronology of Steamboating.

In the May number of *Mechanics* a correspondent writes as follows: The particulars given in an article entitled "Chronology of Steamboating," which

has of late been widely published, and the notes in my diary concerning the early history of steamboating do not agree. I have always understood, and I believe history will bear me evidence, that the first steamboat that was a success and attempted to run regularly was the Clermont. She was named after R. R. Livingston's country residence on the Hudson. Livingston, I have always understood, was the patron and backer of Mr. Fulton. I well recollect the Clermont after she had gone out of service at the close of the war, 1812. She was beached on the North River between the foot of Spring street and the old State's prison. There were no docks there then, nor dwellings. I used, with other boys, to go in bathing where she lay, and was on her over her many times. From recollection, I should say she was less than 200 tons burthen, was rigged like a sloop, had a bowsprit, and for a figure head she had carved out of wood an imitation of a large merino buck. Livingston, Fulton's patron and backer, was a large importer and speculator in merino sheep, hence the peculiar figure head. Shortly before the war the old North River Steamboat Company were chartered, having, as they supposed, the exclusive right to navigate the Hudson River by steam. They built the Car of Neptune, Paragon and Richmond. The Paragon was properly named. She would be a great curiosity to-day. Neither the Car of Neptune nor the Paragon proved a great success. The Richmond was a great improvement, and under Commodore Wiswall's command she ran many years on the Hudson, in company with the James Kent and the Chancellor Livingston.

The North River Company had another boat which does not seem to loom up in history—the Firefly. She was a very small boat and properly named, for she appeared in the distance more like a firefly than a steamboat. They frequently ran her to Newburgh or Poughkeepsie, and occasionally to Albany when any of the other boats were disabled. The North River Steam Company in the early days of steamboating obtained an exclusive right from the Legislature of our State to navigate the Hudson River by steam. This right they enjoyed up to 1823, with only four boats, Richmond, Firefly, James Kent and Chancellor Livingston. In the fall of 1822 General Gibbons, of Morristown, N. J., a wealthy man who was engaged in steamboating on the Delaware, built a new and fast boat for that day. This boat he started from Jersey City and ran her to Albany, and back the day following; an injunction followed. After being some time in the United States Court, with the best and ablest lawyers on both sides, the Court decided the river must be free to all navigators. I believe this was the first State's right suit tried which brought the State and the National Government in collision; it was decided in favor of the Nation.

There are something like 500 men engaged in building iron steamers in one establishment in Norway. On comparing the wages paid at the yard in question, Mr. Raylton Dixon, a well-known shipbuilder of the Tees, estimates that upon a vessel of a given size the labor will cost 25 per cent. less than that expended on a similar vessel built in England. Deduct from this advantage the freight on the materials used in its construction, which at the present time, with the exception of timber, are imported from England, and the result is the Norwegian builder can turn out a 1500-ton vessel more than \$2500 cheaper than his English competitor. The same authority further admits that as soon as the German plate mills are placed upon the same footing as those in England, which are laid out for rolling large quantities of ship plates, England will behold this trade slip away from her unless the workers will submit to still further reductions of wages.

The Ahrens Mfg. Co., manufacturers of steam fire engines, Cincinnati, are about to erect an additional shop to their establishment, which will be two stories high and occupy 50 x 90 feet of space, in which they expect to place a quantity of new machinery. During the past four weeks they have received orders for engines from St. Louis, Chicago, Minneapolis, Vicksburg, Auburn, Ind., and Loveland. The Chicago order was for five engines.

The Nashville, Chattanooga and St. Louis Railroad Company have been offered a bonus to extend their branch line from Dickson, Tenn., to Cumberland Furnace, a distance of 14 miles, and the extension will probably be built. The bonus is offered by a New York syndicate which has recently bought a large tract of timber and iron land lying around Cumberland Furnace.

Combined Beam Compasses and Calipers.

A new and very useful tool, constructed upon novel principles, is illustrated in Figs. 1 to 4 of the accompanying engravings. The tool complete consists of the beam compass and its two rods 15 inches long, two bent rods 5 1/4 inches long, and four couplings. With these parts various combinations are possible, making the tool at once a beam compass that will describe circles from 6 inches

Design for Cast Iron Work.

In the handbook of the Union Foundry and Pullman Car Works, of Chicago, to which we referred in a recent issue, Mr. C. W. Trowbridge, who edited that publication, refers in the following manner to a subject which is only too frequently given little consideration:

So many disturbing elements intervene between the conception of a design in cast iron and the completion of the work in the building that we all have to allow what we

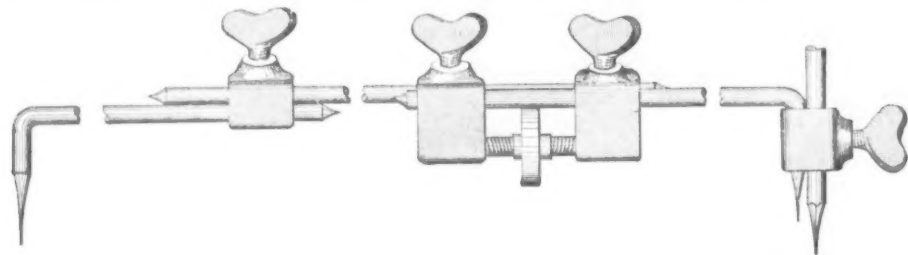
into the body of the column as it draws away in cooling, leaving a little vacancy or depression in the upper part of the shelf or base. Presently these heavy parts will become about the consistency of cheese, but the shaft of the column keeps on cooling and getting shorter. Now the situation becomes serious. The soft metal in the base and shaft is not solid enough to allow the column to draw them bodily through the sand mold, so they stay where they are and the column shrinks away, stretching out more of the soft metal after it, making a

amine their castings carefully they would soon be able to design forms not liable to these defects, and reduce their factors of safety accordingly.

Leaky Boiler Tubes.

Tube ends, according to the *Locomotive*, are a source of annoyance in some types of boilers that give rise to much trouble. This is especially apt to be the case with boilers of the vertical type. The upper ends are exposed to the action of the heated gases, and there, being no water to prevent overheating, they are soon loosened and set to leaking badly. This gives rise to corrosion of the ends of the tubes and the upper head, which in many cases goes on with very great rapidity. It is no unusual thing to find the upper tube sheet of upright boilers eaten half-way through, and nearly all of the tubes leaking badly. This leakage is not so apparent from steam pressure as it from water pressure. To the unpracticed boiler attendant everything may appear to be all right, but when the boiler is filled to the top with water, and pressure applied, there is generally some fun.

The lower ends of tubes are also very apt to give more or less trouble, especially where upright boilers are used for heating purposes and the blow-off does not quite drain the boiler. This is generally the way uprights of the pot-bug type are arranged, and during the summer months, when the boiler is standing idle, the interior of the shell and the tubes, just at the surface of the water left in the boiler, is subjected to severe pitting. Sometimes the tubes of this class of boilers are completely riddled in a very few seasons, whereas, if properly cared for, they should last many years.



Combined Beam Compasses and Calipers.—Fig. 1.—The Tool Arranged with Pencil Point at One End.

to 7 feet in diameter, and an inside and outside caliper with a capacity of from 6 to 40 inches. A pencil point can be inserted in one end of the beam compass by the use of a coupling, so as to still further increase the capacity of the tool. One feature that distinguishes this article from anything similar that has preceded it is the method of adjustment. The mechanism for this purpose consists of two metal blocks, drilled to receive two rods united by a right and a left hand screw, which affords the means of fine adjustment. Each block is tapped for a thumb-screw, so that a rod fastened to one block passes freely through the other block, and vice versa. In using the tool as a beam compass the thumb-screws are

call a factor of safety (aptly characterized by the late Alexander L. Holly, C. E., as a factor of ignorance) to cover these contingencies, varying from three, or one-third the breaking strain in very simple cases, where the quality of the castings can be depended upon, to five or even ten where the design is more intricate, or the liability to shrinkage strains, hidden defects in the castings, rough bearing surfaces or uncertain variations of the load are possible. Much can be done by designers of cast-iron work to reduce this factor of safety, and consequently the weight and cost of castings, by giving serious consideration to the many processes and changes of condition through which their designs pass on the road to the

weak place or leaving a nice little crack to be filled up with putty before the column is painted, and in an extreme case pulling away so much that the head will drop off when the column is hoisted out of the mold. Then the foundryman looks wisely at the column and says, "Now I will fix you," and puts a fillet around below the shelf, or a bracket, which will cool quickly and help pull, chipping out bracket when the column is cold. In case all these fail, he just lays in some cold pieces of pig iron before closing the mold, and they cool the heavy places off rapidly and everything is lovely. This last makes the soundest job in the lot, as they all melt down together; still there is liable to be dirt on the surface, and shrinkage strains that would not be there if the designer had made his metal in the shell only one and one-quarter or one and one-half times as thick as the shaft, put in some strengthening ribs or brackets, and had also made his whole base shell, except a small bead or fillet, thereby justifying a smaller factor of safety, and all parts to cool at the same time.

Mullion columns are often designed with a heavy square face cored out, which stands in front of the wood frames, while a thin web runs back between the sash-weight boxes. This is an exceedingly hard shape to cast without shrinkage strains. The cored part in front only radiates heat from one side (the core being quickly heated through), while the webbed back runs away off toward the remote part of the mold, giving off heat on both sides, and the extreme back edge radiates in all directions but one, thereby cooling much faster than the front part, so that when the back has attained its length for normal temperature the front is still red hot, and much longer. When the front cools there results a strain, which gives this column all it can do to hang together until it gets into the building, without doing its full share of work after getting there. Moral: A good, liberal factor of safety, or a nice large rib of metal, round or square, on the back of the web to keep it from cooling too fast.

The privilege of modifying the thickness of parts of castings to avoid shrinkage strains is one that a designer can safely give a foundryman, for it is always cheaper to make castings right than wrong, to commence with. Still, any foundryman can call to mind numerous instances in which he has received serious rebuffs when he has volunteered advice which he considered good to designers who did not care to hear it; consequently, they are often backward about volunteering their opinions. Unequal cooling and consequent crookedness of shell pilaster faces, frieze plates, and light ornamental work is usually corrected by the foundryman without asking the designer's permission, as it is utterly impossible to get light work straight without providing for equal and uniform cooling. But in the manufacture of thicker pieces and parts intended to sustain loads of any kind, the foundryman never makes changes or asks permission to change if he can possibly execute the work as per drawings received. Generally speaking, a more intimate association between designers and executors of cast iron would result in a great saving of metal and a reproduction of the factors of safety. Imperfect and unsound castings, owing to carelessness in the manufacturing, are much more rare than is generally supposed. Cold shuts from pouring the metal too cold, honeycombs, dirt and scabs from soft or unclean molds are quite rare, and never dangerous in the work of reputable foundries. Many more bad castings are made through an honest endeavor to carry out a design which is not positively the best thing possible for the place than from any carelessness in the execution of the work in hand.

Among the most noticeable indications of shrinkage strains in finished castings is crookedness. One side will be shorter, thereby giving the whole piece a crook, or, in the case of wide plates, they sometimes appear with the center perfectly straight and both edges "loose," or apparently too long for the center. The same may be said of the thin back ribs sometimes put on mullion columns. This comes from the apparently long parts cooling first, so that when the heavier parts cool afterward the light parts are left too long for their places, while the loss of strength incident to these causes is usually provided for by the enormous factors of safety used. Still, if designers would ex-

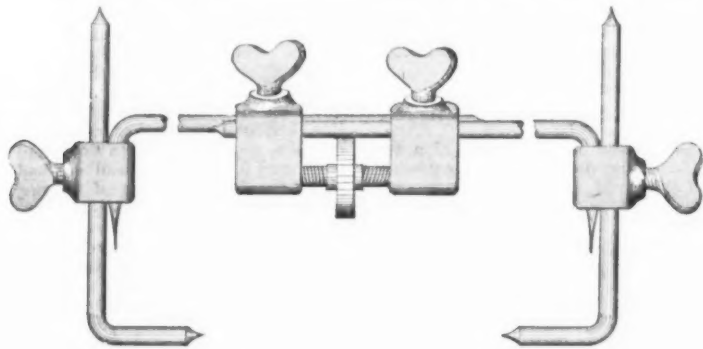


Fig. 2.—The Tool Arranged for Outside Calipering.

loosened and the rods are moved so that their points will be near the required position. The thumb screws are then tightened, and for fine adjustment the double-threaded screw shown between the two blocks is used. For describing a circle larger than the long rods furnished with the tool will permit, the bent rods are removed and straight rods are put in their place; then the bent rods are added to the straight rods by means of couplings. Still larger circles than the nominal capacity of the tool may be described by coupling on any rod of suitable size and of any desired length. By

building. Foundrymen exercise great ingenuity in producing any design in iron that may be presented to them; still, it is possible to design things that are totally impracticable in cast iron, in which case the designer would probably be asked to modify his drawing; but when it is possible to carry out a design without change, it is the almost universal practice to do so without comment and without recollection of the fact that the resulting castings may have very serious shrinkage strains or other defects, which would reduce the strength far below what the designer expected.

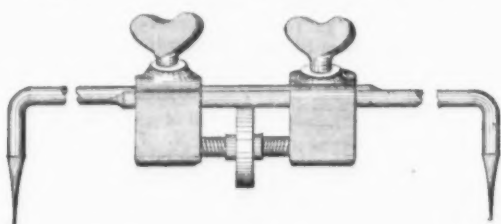


Fig. 3.—The Tool Arranged for Describing Small Circles.

this means a beam compass of any required capacity is secured, with a device at one end for minute adjustment of the points. For inside calipering the points on the straight end of the rods are used. To caliper from 6 to 9 inches, the short bent rods which are furnished are used. For calipering from 9 to 15 inches, the straight rods are used, and for other sizes the length is increased in the same general manner as described for beam compasses. For outside calipering the short bent rods are coupled on to the beam compass points. Lengths are increased in this case in the same general manner as described for the beam compass. This tool will be appreciated by carpenters, pattern-

For instance a column, say 16 feet long, 8 inches in diameter, 3/4-inch metal, is sometimes designed with a heavy projecting base molding near the bottom, say 12 to 14 inches in diameter, giving 3 inches or more thickness to the metal at that point, also having an extension of the shaft to pass down through a shell plinth or pedestal, while at the top there is a shell cap and then a shelf, say 12 by 24 inches, for girders, made, possibly, 2 1/2 or 3 inches thick, to insure strength without the use of brackets or ribs. This, like all other architectural work, will be molded in "green sand," which is molding sand slightly dampened with water and rammed solidly around the wood pattern, form-

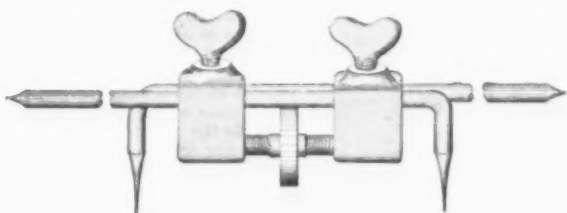


Fig. 4.—The Tool Arranged for Inside Calipering.

makers, millwrights and members of the various mechanical trades who have occasion to describe circles or caliper work over 6 inches in diameter. Four sizes are made, taking rods from 1/2 to 3/4 inch in diameter. J. Q. Maynard, of No. 12 Cortlandt street, New York, is putting this article upon the market.

Our readers will observe among the Special Notices on page 22 that several properties are offered for sale which are worthy the attention of capitalists looking for such investments. Among these may be mentioned the Harrison Iron Works, St. Louis; the plant of the Parkin File Company, Cleveland, Ohio; the White & Sanson Cutlery Works, Philadelphia, and others. The particulars are given on the page designated, with several other announcements of a similar nature.

ing a mold strong enough to withstand the wash and pressure of molten iron running into the mold. When we consider that iron weighs 450 pounds per cubic foot, while water only weighs 62 1/2, an idea may be formed of the strength of mold necessary to stand the wash and pressure, which, in a mold 3 feet high from the bottom of the casting to the top of the gate, where the iron is poured in, is 1440 pounds per square foot, nearly 3/4 ton on each square foot of surface; consequently, the sand must be firm.

Now, realize that the pattern for this 16-foot column is made 16 feet 2 inches long, to allow for shrinkage; also remember that when this shrinkage occurs something has got to give. The shaft of your column, being only 3/4 inch thick, will solidify and commence to shrink while the metal in the top is still fluid, and little metal will run out

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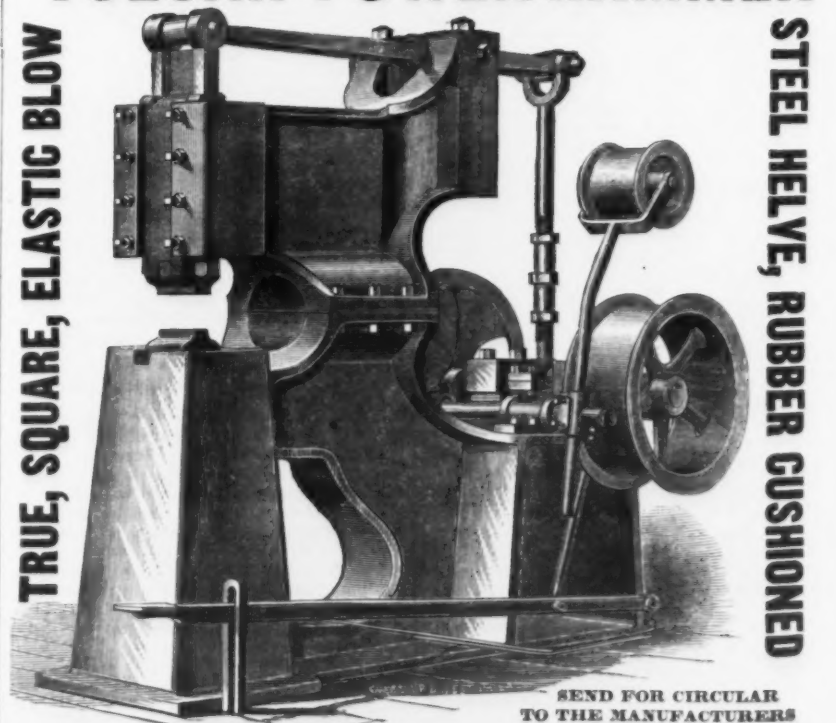
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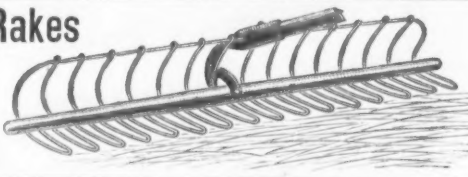
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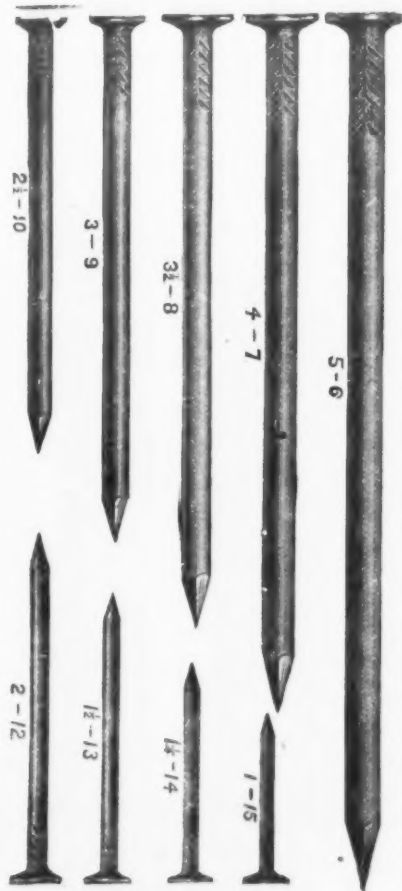
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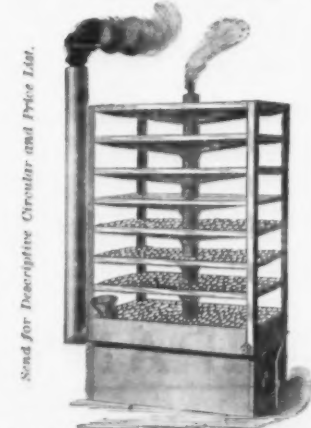
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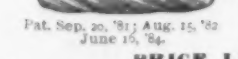
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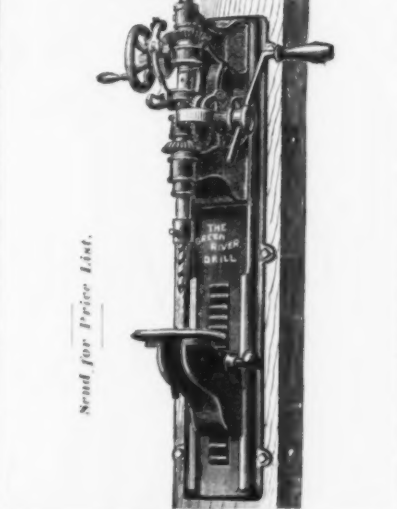
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New Spring-Wheel for Traction Engines.

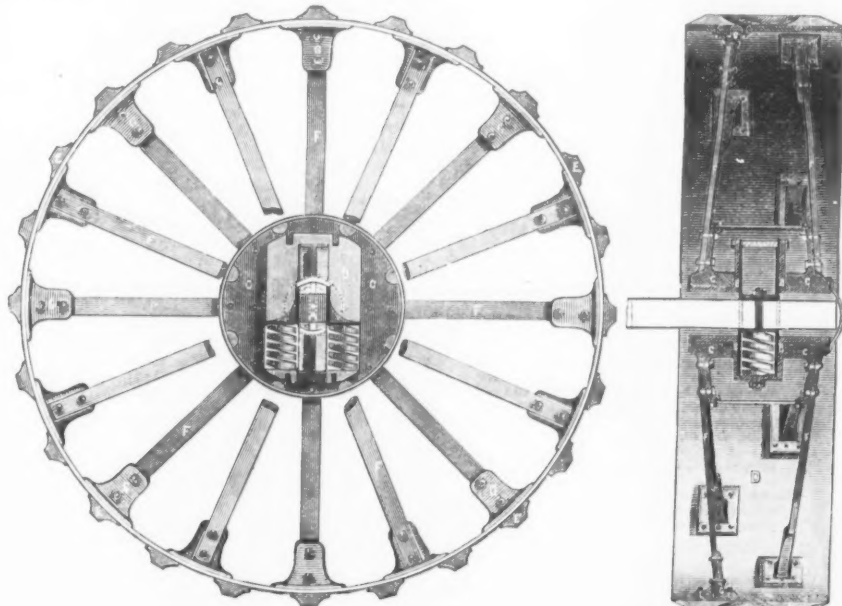
The Huber Mfg. Co., of Marion, Ohio, are putting on their traction engines a new spring-wheel, shown in the annexed cuts. The springs, as will be seen, are between the two bearings of the wheel or of the hub, on trunnions which form the spindle for the hub. The trunnion extends up and down from the center of the hub, forming a bearing for the bracket, which is fastened to the axle, holding the wheel at right angles with the axle, but free to slide up and down in the slotted trunnion. For use on traction engines the wheel is made with a 14-inch steel tire, and with malleable-iron cleats on the tire, as shown in the cut. This is an entirely new departure for supplying traction engines with springs, and some advantages over the old methods are claimed for it. Thus, with the use of this wheel the axle can be rigidly secured to the boiler with all

that weakest place. It would be easy to compute theoretically how much greater the fiber strains are on the top edge than on the bottom, and hence, by means of the formula deduced from Wöhler's famous experiments on alternating strains, how great the excess of downward strains would have to be before fracture in the base could occur; but the refinement would be useless, since experience has already shown that in practice fractures do not occur there.

Porter's Planer Chuck.

Probably no mechanic has used a planer chuck without being more or less annoyed by the accumulation of chips and dirt in the slots or holes which are usually important factors in its construction, and also by chips getting between the chuck and planer table. The Porter planer chuck, of which we present illustrations, is particularly designed to do away with this annoyance, presenting

circumference. A dog is fitted to a groove in the under side of the chuck flange (Fig. 3), having teeth in one end corresponding with notches in the dial, and a slot in which works an eccentric. The eccentric-shaft passes up through the chuck between the set-screws (Fig. 1) and has the end milled to receive a wrench. By turning this eccentric the dog is moved to and from the dial, thus locking or unlocking the chuck, as may be desired. The notches in the dial and teeth in the dog being tapered, it is only necessary to bring the two lines within a reasonable distance of each other, when by throwing in the dog the chuck is brought to the correct angle, and cannot be moved in either direction so long as the dog is kept up in place. The parts being so few and simple, and, what is more important, having absolute protection from dirt, there is nothing to get out of order. This chuck is also made without the bottom or swivel plate. The length of jaw is 9 inches; depth of jaw, 1 1/4 inches. The chuck will take 5 inches with jaw in



THE HUBER SPRING-WHEEL FOR TRACTION ENGINES.

the gearing, making the axle, gearing and boiler all rigidly secured together. Then by slipping on this wheel the engine becomes firmly located on springs, and is capable of running over rough roads at high speed without jar or damage to the engine or gearing.

By having the springs under an engine at the extreme end of the axle the rocking motion is prevented and the engine always kept in nearly a vertical position. This is a noticeable advantage on side hills or where the wheels on one side run in a gutter. The wheel is designed for use on any vehicle where strength is the main object. For use on fire engines, heavy truck wagons and the like, where the springs are required to bear up a heavy load that is to be drawn over

only a plain surface, which is easily cleaned with a brush, and has no slots or holes through which chips can find their way into the interior of the chuck or to the planer table.

Fig. 1 shows the chuck complete. The movable jaw is provided with a hook at either end. This hook swings upon a cam, which is part of a bolt having its bearings in the jaw. The hook swings into a groove in the side of the chuck, and, by turning the cam-bolt, the jaw is firmly clamped to its bed. The hooks, being placed near the work face, prevent the jaw from tipping when forced up to the piece to be planed. The wrench is applied to the cam bolts vertically, thus allowing parallels or blocks of any thickness to be used for filling between the

place and 7 1/4 inches with jaw removed. It is manufactured by Wallace Porter, of New Haven, Conn.

The area under wheat in South Australia in 1885 is placed at 63,000 to 64,000 acres more than for the crop of 1884, which makes the total area of 1,910,000 acres, against 1,846,351 acres for the crop of 1884. The output at 9 bushels per acre is 17,190,000 bushels. Allowing 1 bushel per acre for seed and 5 1/2 bushels per capita of population for food, the surplus available for export is 13,590,000 bushels. The yield in the colony of Victoria will be about 1,560,000 bushels less in 1885 than in 1884. After allowance for seed and food, the estimated available

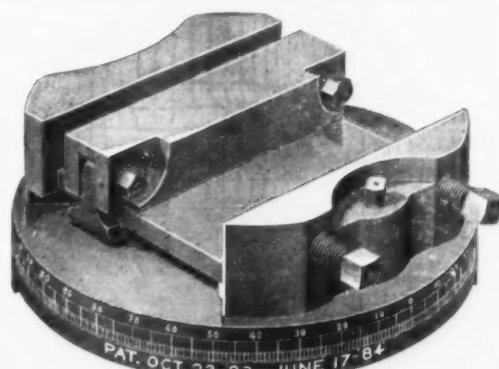


Fig. 1.—View of Chuck Complete.

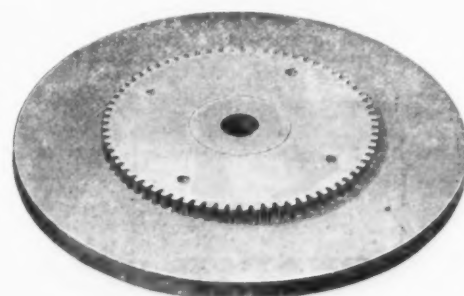


Fig. 2.—View of Swivel Plate.

roughly-paved streets at a good speed, it is specially well adapted. This wheel is the invention of Mr. Edward Huber, of Marion, Ohio.

The Causes of Fracture of Angle Bars.

A correspondent of the *Railroad Gazette* suggests that an important cause for the fracture of angle bars on the top edge is that they have been bent downward at the center, either in manufacture or by previous use on a low joint, so that they "have to be forced into place with a hammer, which produces an undue strain upon the upper edge of the bar at the center, causing it to break." This he thinks is proven because the fractures always occur on the upper edge. Without doubting that fracture from this cause may sometimes occur, the theory hardly appears to meet all the facts of the case. Of the large number of such fractures which occur only a few of them can be reasonably supposed to arise from injury at other points or from such defects of manufacture that the angle bar needs to be hammered into place, and there is a reason other than that suggested why the cracks should always come on the upper edge instead of in the base, provided there is ever a tending strain upward, viz., that there is a less area of metal to resist fracture there, and that the upper edge is further from the "neutral axis," or line where bending neither stretches nor compresses the fibers.

It is not necessary to assume that the bending strain must be always upward to account for the fractures always being on the upper edge. In fact, experiment has long since shown that the alternating strains are the most dangerous of all, and will ultimately cause fracture under far less strain than would be required if there were not such alternation. Assuming the breaking strains downward and the breaking strains upward to be of equal frequency and force, it is inevitable that the weakest place will show the first fracture, and the top edge is

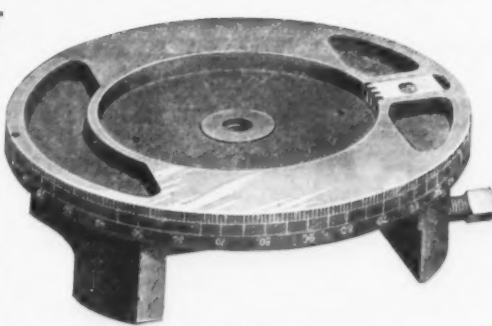


Fig. 3.—View of Lower Side of Chuck.

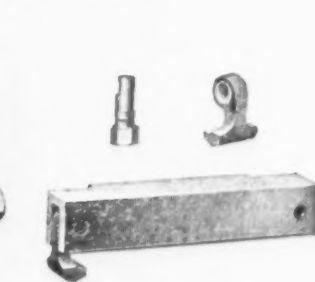


Fig. 4.—Jaw with One Cam-Bolt and Hook Removed.

PORTER'S PLANER CHUCK.

jaw and set-screws. Fig. 4 shows the jaw with one cam-bolt and hook removed. An eccentric bushing forced into the hook forms its bearing. Should the hook lose its grip from wear of bearings or from planing off the bed of the chuck, it may be adjusted by forcing out the bushing, giving it part of a turn (always turning so as to throw the hole toward the outside of the chuck) and forcing back into position. The jaw may be clamped to any practicable taper, and may be removed from the chuck entirely by swinging out the hooks and lifting it off. The chuck is graduated and so constructed that it may be locked at zero and at any 5 degrees.

Fig. 2 shows the bottom or swivel plate, having a tongue on its under side for the slot in the planer table, and a dial firmly fastened to its upper side and accurately fitted to a recess in the under side of the chuck (Fig. 3), thus forming a pivot around which the chuck revolves. The dial has 72 notches (one at every fifth degree) cut in its

export surplus is 6,540,000 bushels. New Zealand will probably have about 4,500,000 or 6,000,000 bushels of wheat for export, or a total of 25,930,000 bushels. Shipments, however, after May 1, 1885, will not be available for consumption in Europe until after September 1.

Marskell, an American inventor, has commenced a suit before the Chancery Court in Toronto against Bell, a wealthy Canadian organ manufacturer. It appears that the plaintiff discovered an easy and cheap process for converting iron into steel. Bell, hearing of the invention, proposed to form a company to manufacture steel under the new process. A test of Marskell's new process was made at Niagara Falls, which, it is claimed by the plaintiff, discovered his invention to Bell. The latter then refused to carry out the agreement. Marskell's action is to recover \$100,000. The suit depends upon the evidence to be given by newspaper correspondents who witnessed the test at Niagara.

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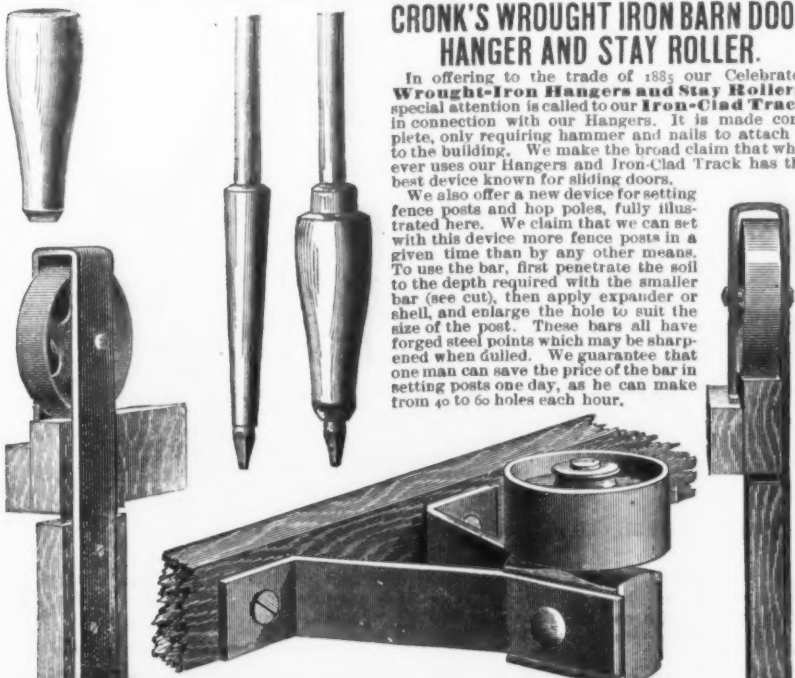


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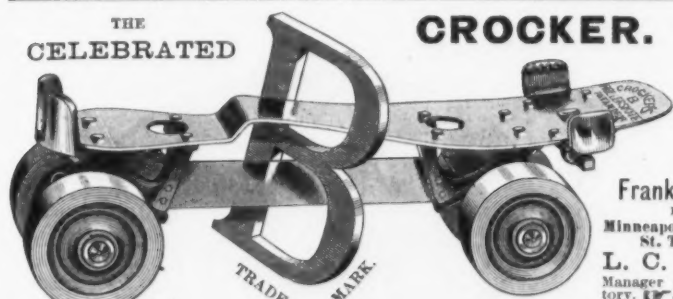
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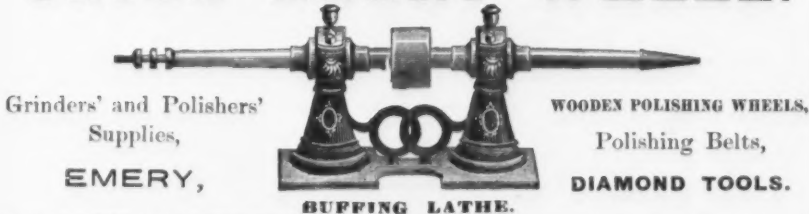
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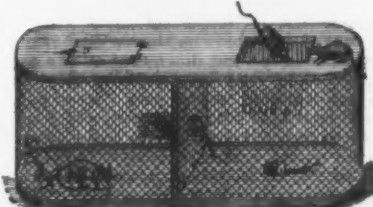
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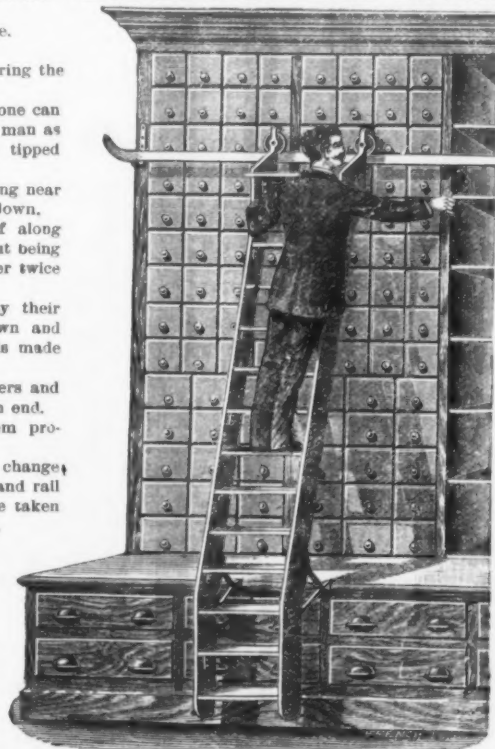
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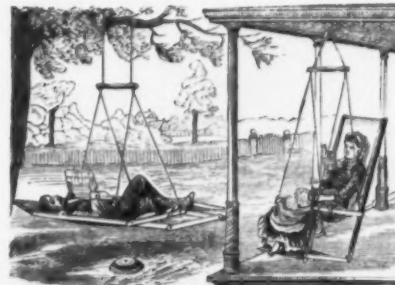


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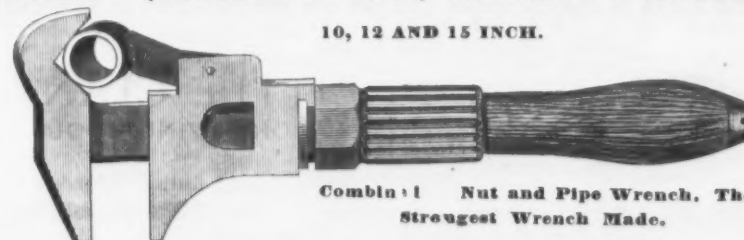
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The Manufacture of Iron and Compound Armor Plates.

(Concluded from page 21, May 7.)

Casting the Steel.—It is considered immaterial whether Bessemer or open-hearth steel is used for compound armor plates. Experiments have shown that, so far as their manufacture is concerned, the class of steel does not affect them, but the Cammell Works' open-hearth steel was exclusively used until May, 1882, because the manufacture was carried on at the Grimesthorpe Works, where there was no Bessemer plant. After September, 1882, however, only Bessemer steel was used, because there are only converters at the locality where the plates are now made by the new method. During the period of transition, from May to September, 1882, when the first method had not been completely abandoned, both grades of steel were used. At the Brown Works only Bessemer steel has been taken, but only for the reason that it is hotter and is more suitable than open-hearth steel for the method of manufacture adopted at the works in question. The casting itself is done from a ladle.

The experiments made by Cammell & Co. in 1878 and 1879 at Portsmouth and Shoeburyness with compound plates of different construction, and the trials of the plates for the inflexible, have proven it to be most advantageous to make the thickness of the steel equal to one-third of the thickness of the compound plate. The first steel casting must be from 1.5 to three times as thick as the thickness of the final steel layer of the compound plate, the former ratio holding good for thick and the latter for thin plates. This and the dimensions of the finished plate determine the thickness of the iron plate which enters into the building up of the pile.

At the works of Brown & Co. the same rule is followed, so far as the relative thickness of iron and steel in the finished armor plate is concerned, but, on account of the steel top plate, the thickness of the steel casting is only one-half to two-thirds of the total thickness of the steel part of the compound plate.

The steel used for compound armor plate varies from .5 to .9 carbon. The opinion is held that it is good to make the steel as hard as possible, although increased hardness entails difficulties in rolling and bending. It is probable that the hardness of the steel should bear some relation to the thickness of the steel part of the plate. Thus very thick plates might be made with less than one-third of steel, but that very hard metal.

Tests made in Prussia indicate that a compound plate with .4 carbon steel possesses no advantages over good wrought-iron armor plate. When the percentage of carbon rose to .5, the plate proved 12 to 15 per cent. better, and with .6 carbon excellent results were obtained. On comparing the results of trials of different compound plates of English make with the Creusot all-steel plates, which always contain .43 carbon, the conclusion may be drawn that the penetration of projectiles was only less in the case of compound plates when the carbon contents of the steel were at least .7 per cent.

The following series of analyses will convey an idea of the composition of the steel used for compound plates:

Cammell plates.	Carbon.	Silicon.	Manganese.	Phosphorus.	Sulphur.	Copper.
1. Average of Prussian tests, 4.	.578	.153	.617	.054	.046	.026
2. 12-in. plate.	.97
3. 10-in. "	.842	.38	2.06	.093	.06	...
4. 10-in. "	.75	.181	1.45	.063	.032	...
5. 7.87-in. "	.66	.1	.93	.03	.05	.02
6. 7.87-in. "	.62	.12	.93	.02

The tensile strength of the steel used in compound armor plates ranges from 87,000 to 100,000 pounds per square inch, the elongation fluctuating between .2 and 2 per cent.

The Brown method of making compound armor plates is more costly than the first method used by the Cammells and cannot compare, so far as economy of manufacture is concerned with the latter Cammell practice. Welding of the steel to the iron fails sometimes in the latter method, but it may be answered that with the Brown compound plates, in which the surface to be welded is twice as large, the danger of failure is even greater. Further technical reasons for the assumption that the Brown method is not the rational one grow out of the formation of oxides during the heating. They undoubtedly increase the difficulty of obtaining a perfect union, and as yet no good means has been found to rid both the iron plate and the steel top plate of these oxides. When no account is taken of the conditions affecting the welding in these plates, it might appear that the Brown plates should be better than those of the Cammell make because from one-third to one-half of the thickness of the steel consists of a material much more thoroughly worked than the steel simply poured in. It must follow from the trials of both plates, however, that the Brown plates are never better than those produced by the Cammells, and in many cases yield inferior results. The advantages which the steel cover plate might afford to the Brown system are therefore overcome by drawbacks due to influences acting injuriously upon a perfect union brought about by the use of the cover plate. Among these the cylindrical support bolts may be mentioned. It should be noted, furthermore, that if internal strains are admitted to exist in compound plates, they must occur to a greater extent in the Brown plates. The only advantage which the steel cover plate of the latter possesses is that it does not show cracks on its surface. If steel sufficiently high in carbon and somewhat lower in manganese and silicon is chosen, such cracks may be avoided even without a cover plate. A third method, a combination of those of Cammell and of Brown, appears to be better than either of them.

Rolling Compound Armor Plates.—About half an hour after casting the steel the plate is lifted out of the apparatus and put into a reheating furnace. The heating must be done in such a manner that the steel does not get too hot, while the iron is well-heated.

The plate is therefore put into the furnace with the steel downward. It is then rolled in the same train used for the iron plates, only with this difference, that the rolls are let down less after every pass. For this reason it is necessary sometimes to heat the plate once, or even twice if it is very thick. With these plates the rolling is stopped when the plate is cherry red. Little attention is, however, paid to the color of the plate, and immediately after rolling it is put under a press to be straightened or bent into the desired form. With complicated shapes the heat from rolling does not suffice, and a special heating must be resorted to.

Special Sections of Armor Plates.—Latterly armor plates having special sections like those of Figs. 1 and 2 are used for vessels. They are produced in the same way so far as preparing and working the material is concerned, and differ only in the shape of the piles. For the plate B, Fig. 2, the pile is arranged in the manner shown in Fig. 3, with the aid of three rows of puddled bars, a b c, placed between cover plates in single or double layers. The layers between P R and N M provide for the gradual change in thickness from P R to N M. Naturally the composition of a pile having a section like B in Fig. 1 must be arranged throughout like the part R P M N in Fig. 3. The material for these layers is not specially produced, but is taken from stock of similar grades of iron. A really gradual reduction cannot be obtained in this manner. In order to counteract the injurious effects which such a method of building up the piles might have upon the quality of the armor plate, the difference between the thickness of the various

parts is considered inevitable. It is impossible to gauge the importance of this fault upon the quality of the armor plate, because there are no figures showing the results of firing tests of plates with and free from blow-holes. It should be noted, too, that the blow-holes are not uniformly distributed in all parts of the plate, but in the majority of cases are scattered along its edges. When the thickness of the steel plate is great the development of these blow-holes is greater. This fact justifies the conclusion that the longer time in cooling prevents the escape of the gases from the steel and aids the formation of blow-holes. The gases are partly formed during the process of steel making, partly through the reduction of the coating of oxides on the iron plate and partly through the pouring of the metal in a thin stream. It would be difficult to explain the presence of so large a quantity of gas in steel carrying as much as .9 carbon without assuming that the oxides referred to are decomposed by the carbon in the steel. The bubbles of gas gradually forming have a tendency to move upward in the steel while it is still fluid. This explains why in the fractures of thick plates there is a far smaller number of blow-holes in the center than at the edges. If, therefore, armor plates were trimmed more closely than is now generally done, those parts containing blow-holes would be removed. This would increase the cost and is not absolutely necessary. Nevertheless, it would be desirable to possess some means to make the steel perfectly homogeneous, provided it did not unfavorably influence its mechanical properties. The blow-holes are irregular in form and are irregularly distributed. Fig. 10

iron adhering to it. This happens more frequently with thick plates fired at by very heavy projectiles.

NEW PUBLICATIONS.

ANNUAL REPORT OF THE STATE GEOLOGIST FOR THE YEAR 1884. Published by the Geological Survey of New Jersey.

Profs. George H. Cook and John C. Smock, the geologists, and C. Clarkson Vermeule, the topographer, of the Geological Survey have continued their labors during 1884, reporting the progress made in the volume before us, besides the geodetic and topographical work. The latter is now to be carried on, by mutual agreement, by the United States Geological Survey, which will defray the expenses of completing the field work. That part of the geologists' work most interesting to the readers of *The Iron Age* is the ninth chapter, on "Iron Mines and Mining Industry," the facts being gathered by Mr. George E. Jenkins, of Dover. Mr. Cook's summary of the data collected is certainly not very encouraging to the New Jersey mines in one respect. After referring to the competition of foreign ores and of the new mines along the Hudson, Professor Cook says: "It is evident that those mines only can hope to continue at work where there are advantages of location, of rich and excellent ore, of ease of working and of economy in management. And it might also be added that ownership or leaseholds by furnace companies or iron manufacturers is also a condition of profitable running, since the prices in the general market are so low. As a result of this condition of things, less

Others have, however, languished on account of the obstinacy of some railroad managers in refusing to read aright the signs of the times. Referring to statistics Professor Cook says: "The total shipments of iron ore from stations in the iron-ore district for the year 1884 amounted to 393,710 tons, or a deficit of 127,706 tons as compared with the amount of 1883. The decrease is about 24 per cent., or a little less than one-fourth. This shrinkage is not so bad as that of 1874, nor has the production fallen so low as it was in 1876. The outlook for the immediate future is, however, not promising of any betterment, and the depression continued through the next year will certainly reduce the total output to a lower figure."

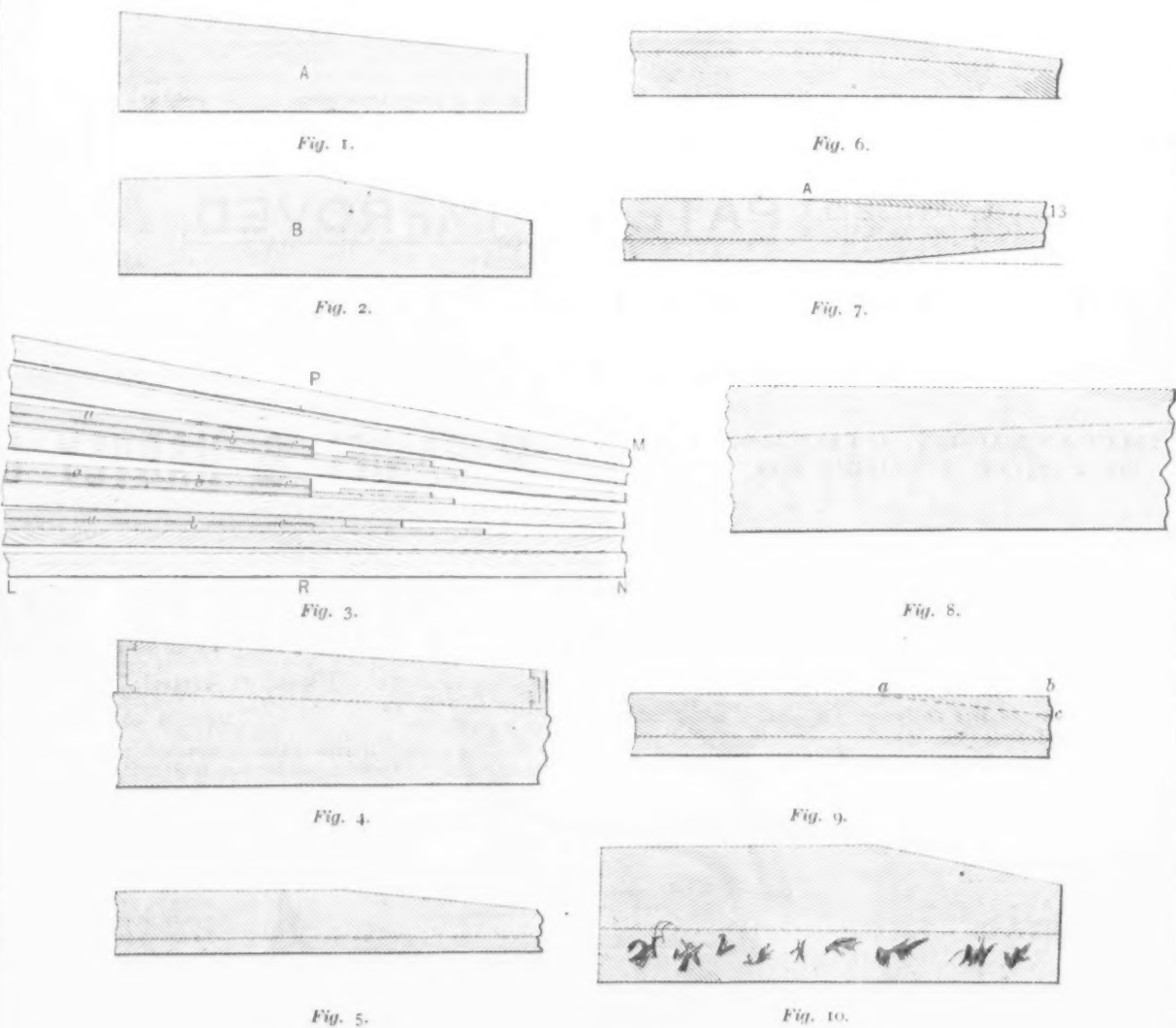
Turning to the list of mines we call the following notes: The Hacklebarney mines, Chester, mined about 1500 tons a month. A new gravitation road has been built and a Taylor-Langdon roasting furnace erected. The Samson, in the same locality, turns out about 8500 tons annually. An analysis of 15,000 tons averaged 53.9 per cent. of iron, 11 per cent. of phosphorus, 3.8 per cent. of sulphur, 11.81 per cent. of silica and about 3 per cent. of lime. The Cromwell mine, bought last October by the Chester Highland Iron Mining Company, is getting ready for an output of 2500 tons per month, a rock-drill plant being in course of erection.

The borings at the Cooper mine have been continued. The Crane Iron Company have taken the machinery away from the Carbon mine in Randolph Township, and a similar fate has met the Baker and Byram mines in the same locality. The Dickinson mine is finishing a new shaft. It had 25,000 tons of ore on the dump at the time of the report. A new plant has been provided for the Hoff mine, near Port Oram, operated by Oram, Hance & Co. The Irondale mine, which is worked by the Crane and Thomas companies, has added a compressor, Rand drills and other new machinery, and similar improvements are going in at the Mount Pleasant, which ships from 2500 to 3000 tons a month. The Richard mine, worked by the Thomas Oram Company, is yielding 5000 tons a month. The Glendon Iron Company are taking out 20,000 tons a year from the Teabo mine at Rockaway, while the Winder mine in the same locality is getting ready for work. The Lower Wood Hibernia, which supplies the Andover Iron Company, ships 3200 tons a month. The Hibernia mines have together shipped 59,681 tons during 1884. The product of the Ringwood mines, 2000 tons a month, goes to the Durham Furnace. Recent developments have been favorable. The Turkey Hill and Swayze mines have taken out about 15,000 tons during 1884, less than half their capacity. At the Mount Olive, Morris County, a new shaft was discovered in 1884, which is being opened out. The Hurd mine, also in Morris County, which is leased to the Glendon Iron Company, has been doing dead work chiefly. On December 1 it had a stock of 21,223 tons at the mine. The Ford mine started work in July last, while in the adjoining Scofield mine development work is going on. From the Oxford Furnace mines only 19,564 tons were taken in 1884, a little more than half its capacity. The Ogden mines have continued to work steadily up to capacity, 20,000 tons per annum.

TENTH ANNUAL REPORT OF THE OHIO STATE INSPECTOR OF MINES FOR THE YEAR 1884. Columbus, Ohio, pp. 128.

Formerly the Ohio Inspector of Mines had but one assistant to aid in his work, and, as there were 332 mines in the State coming under the jurisdiction of the inspector, it became physically impossible to see to the enforcement of the laws by personal visits. Fully appreciating that fact, the Legislature of the State passed a bill dividing the State into three districts, creating the office of chief inspector, who has an assistant, and a district inspector for each of the subdivisions. Mr. Thomas B. Bancroft, the chief inspector, and his new force entered upon their duties on the 1st of May, and have apparently done their work conscientiously and thoroughly. In less than six months 43 new ventilating furnaces and 10 fans were put in where no artificial means of ventilation previously existed. We have already reproduced Mr. Bancroft's tables of production of coal and iron ore. He follows this up with a list of the accidents during the year, and then prints a lengthy review of the mining law, in which he dwells on the necessity of full reports of accidents, on the enforcement of the provisions calling for mine maps brought to date at regular intervals, on the troubles experienced in testing the accuracy of weights and measures used at the mines, and on the dangers growing out of placing boilers and hoisting machinery too close to shafts, and the insufficiency of space between the track and the walls in slopes and engine planes. Mr. Bancroft is evidently in earnest, but we fear that he is slightly afflicted with the prevailing malady of mine inspectors of trying to reform too much within a given time. We feel convinced that if these gentlemen would move forward more slowly they would in the end accomplish a good deal more. The trouble does not so much lie in discovering what safeguards are wanted to protect life and limb of the men, but in enforcing even the most elementary rules of safety. When that is accomplished let them attack minor questions. A mine owner is apt to become restive and unmanageable when his whole establishment is rooted over and he is overwhelmed with an endless array of orders and recommendations. A very interesting chapter in Mr. Bancroft's report is his review of the numerous labor troubles in the Ohio mines in 1884, especially since it is, on the whole, fair and impartial in its tone. Mr. Bancroft's general report is followed by detailed reports on the condition of the mines, in their respective districts, of Inspectors Wm. Dalrymple, Wm. A. Davis and Austin King, Jr. A list of all mines employing more than 10 men is appended.

Some idea of what a first-class ironclad fleet would cost the United States may be obtained from a few French figures. An ironclad was launched at L'Orient last month which had been nine years building and cost 20,000,000 francs, or about \$4,000,000. It will take another year to fit this costly vessel for action.



MANUFACTURE OF IRON AND COMPOUND ARMOR PLATES.

parts is not made proportionately as large as it is in the finished plate. Thus, the reduction of three piles for the plate shown in Fig. 1 was 520 to 390 mm. for one, 620 to 545 mm. for the other, and 635 to 557 mm. for the third. The piles so formed were used in making iron armor plates of the special section shown.

The iron and compound armor plates thus produced are rolled on the ordinary trains, except that for a section like Fig. 1. The upper roll is given an inclined position. It is almost impossible to avoid cracks during the rolling or in the subsequent bending. When it is considered that the iron plate for making a plate of the section Fig. 2 is conical, and that the compound plate is rolled with the steel facing downward it will be understood that the desired section can ultimately be obtained only by bending over half of the plate. The drawings appended will illustrate this, the upper part in Figs. 4 and 6 and the lower in Figs. 5 and 7 being steel. Fig. 4 is the compound armor plate, Fig. 5 is the plate rolled out and Fig. 6 is the form of the plate as it should be; therefore the part A 13 must be bent into the position shown by dotted lines under a press. The difficulties of this method will be readily understood. In 1882 and 1883 the Cammells made such plates for the Russian man-of-war *Wladimir*, but even the last plates for that vessel were made in a different way in order to avoid the danger of frequent failure. The pile had the section shown in Fig. 8, a layer of steel been cast on the conical iron in such a way that the section of the two was rectangular. Then the plate was rolled out evenly, the wedge-shaped part a b c, Fig. 9, was planed off, the plate reheated and then pressed into the form desired. A similar method was adopted by the Brown Works in rolling the plates for the Russian frigate *Dmitri Donskoi*.

After having described the methods used for the manufacture of compound armor plates, some idea may be formed concerning the faults which they may show. These faults may be divided into two classes: those to which all armor plates may be subject and those which are occasional only. Among the former may be mentioned blow-holes in the steel, which the English Admir-

ity considers inevitable. It is impossible to gauge the importance of this fault upon the quality of the armor plate, because there are no figures showing the results of firing tests of plates with and free from blow-holes.

A second fault of all armor plates is abnormal strains in the metal which at the least opportunity make their appearance as cracks. They are the result of the necessity of being forced to work under the same conditions, hard steel and wrought iron firmly united to one another. If, however, the welding of the steel and the iron is complete and the iron backing is thick enough, there is no reason to fear that this fault will have an unfavorable effect upon the resistance of the plate.

Among the occasional faults may be mentioned imperfect welding of the iron and the steel, cracks, the burning of the steel at some places, and defects in the iron plate. Incomplete welding of the steel and the iron plate is the grave defect of compound plates. Compound plates show a tendency to cracking through the steel layer. By the impact of the projectiles two classes of cracks are formed, radial and concentric, the latter generally being the result of the first shot. It is evident that these cracks may cross one another, in which case that part of the plate in which the weld is imperfect will be destroyed by the dropping off of the steel. Cracks in the layer of steel noticeable even before firing are of two kinds, either following the length of the plate formed during the bending or even during the rolling, or cross cracks which may appear after the casting of the steel. Cross cracks may show, too, in bending the turret plates, which are generally strongly curved. Firing tests have proven that plates showing these defects are not affected by them so far as their good quality is concerned, provided the welding is perfect and the steel is hard enough.

Burning of the steel happens sometimes, but hardly deserves consideration, because the burnt parts, generally along the edges, are removed in turning. It does occur sometimes, however, that the burning penetrates some distance into the plate.

Good welding of the different parts of the iron plate is of great importance with compound plates, since the shocks caused by the impact of the projectile may lead to the severing of the steel layer and that part of the

favorably located mines, or those which are expensive to work, or yield lean or inferior ores, must be abandoned and the capital and labor on them be turned into other channels. The work of prospecting for new locations is almost at a stand still. Reviewing the district it may be noted that all the mines in Passaic County are idle, so far as active, producing work is concerned; in Morris County the Hibernia, the Mount Hope, the mines in the vicinity of Dover, the Chester and the Hacklebarney mines, and the Hurd, Ford and Scofield are at work; in Warren and Hunterdon counties, or the Southwestern Highlands, Kishpaugh, Oxford Furnace and West End mines are the only localities where ore in any considerable quantity has been raised; in Sussex County the Ogden mines are the sole producers. A large number of mines have been temporarily closed or have been abandoned. Some of them may be said to have passed into history, as their period of activity has come to an end, apparently for all time. A prominent fact is the general introduction of improved machinery for extracting and handling the ore. And much work has been done during the past year in this direction. At nearly all of the large and working mines something has been done to reduce the cost of the ore. Power drills, explosives of higher grade, better pumps, larger engines, slopes with easier and more regular grades, shafts striking the ore more directly, and outside tracks and screens, to save as much handling and sorting the ore on the bank, all these improvements are being made in the mines, so that the mining plants are now among the best in the country. That these improvements are justifiable in the matter of economy is already proved; that they are warranted by the probable persistence and extent of the ore bodies still unattacked appears to be shown by the history of these larger and more productive mines whose working period has been so long, and their aggregate product has already amounted to hundreds of thousands of tons of ore." Professor Cook might in this review have referred to the fact that at least some of the mines have been favored by literal concessions in the way of railroad freights.

ASK YOUR JOBBER FOR

ALAN WOOD & CO.'S

PATENT LEVEL GALVANIZED SHEET IRON,

And Have No Other.

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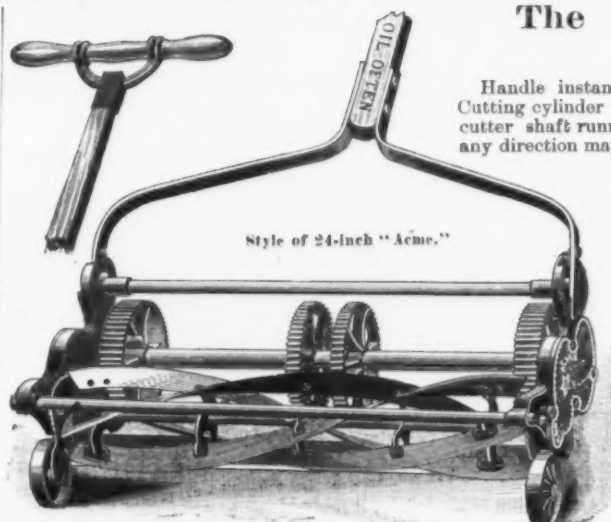
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The only practical
FORWARD-CUT
ROLLER MOWER
ever on the market,
combining Durability
with extreme Light
Weight.



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T. & A. Pickering, Cincinnati, Ohio.
Hildebrand & Fucate, Indianapolis, Ind.
Scobie & Parker, Pittsburgh, Pa.
Frank C. Porter, Buffalo, N. Y.
Geo. B. Bahr & Co., Louisville, Ky.
Geo. W. Rouse & Son, Peoria, Ill.
Samuel G. B. Cook & Co., Baltimore, Md.
Farwell, Ozmun & Jackson, St. Paul, Minn.
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Lindsay Brothers, Milwaukee, Wis.
B. L. Dragg & Co., Springfield, Mass.
A. D. Perry & Co., Syracuse, N. Y.
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The "Acme" Lawn Mower.

MERITS OF CONSTRUCTION:

Handle instantly attached or detached without touching the Mower. Cutting cylinder has four knives, all tempered to a standard. Steel cutter shaft running on Steel gibs so arranged that all possible wear in any direction may be compensated for. Patent cam pawl and ratchet, absolutely positive, silent and durable. Truck wheels run on hardened steel studs, protected from dirt, &c. Truck arms encircle cutting cylinder journals, giving greatest possible range in height of cut. Powerful traction. Perfectly silent. Easily operated. All sizes geared at each end. Every part made to standard gauges, and interchangeable.

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Cuts high terraces with rope attachment, cuts borders, cuts mounds, cuts over holes, cuts within one inch of a wall, fence or tree. Cuts wet grass without clogging. Cuts heavy, tough grass with comparative ease, and especially adapted to cemetery work.



QUAKER CITY LAWN MOWER.



Guaranteed Super-
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MOWER
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THE QUAKER CITY Reduced in Price.

Now, why buy a worthless mower?

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1885.

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LAWN MOWER.

Has no Equal, Sur-
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"THE BEST."

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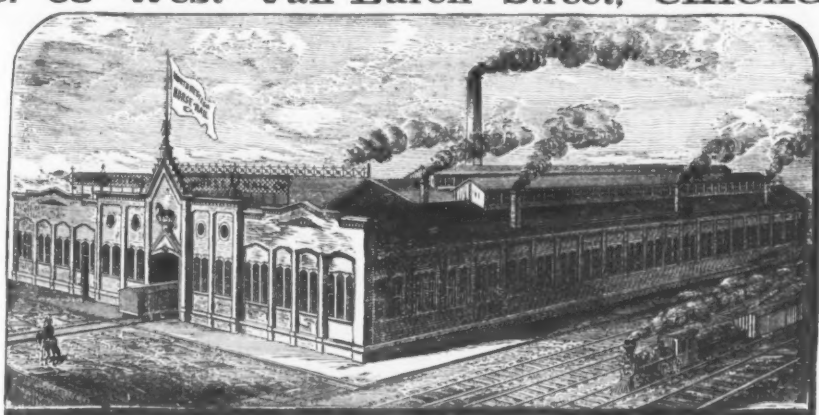
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IN QUALITY, uniformity of shape and style, they are unequalled.

They are the safest nail to drive.

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THE CUT BELOW represents our latest patent "Wonder" Cross-Cut Saw, of which style of teeth we shall use for our Cross-Cut One-Man Pruning and Buck Saw. This tooth has all the direct fast cut of the Lightning, combined with the clearing teeth of the Champion, making it, as its name indicates, the Latest Wonder, and by actual test we decide an advantage of 20 per cent. over our former world-renowned Lightning Saw. Having newly organized January 26th, 1885, as the E. M. Boynton Saw and File Co., we shall be prepared to fill any orders for the above, as well as for goods which have been furnished our customers throughout the world for the last 14 years.

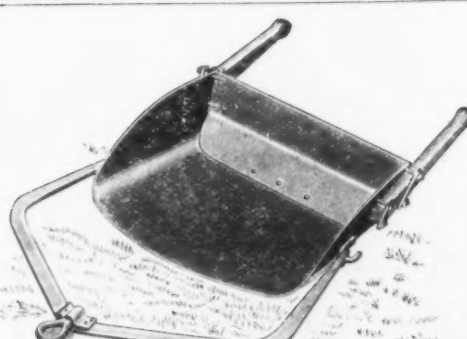
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Our New Patent Double Edge Pruning Saw.

Respectfully yours,
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LATEST PATENT.
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N.Y. CITY.

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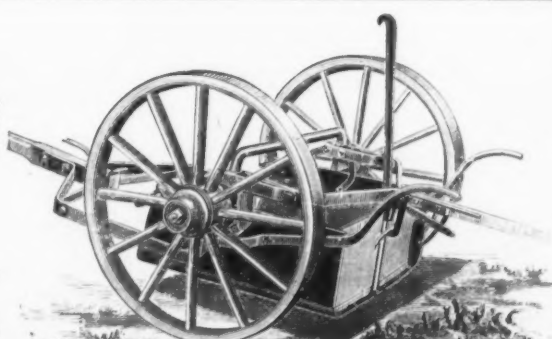
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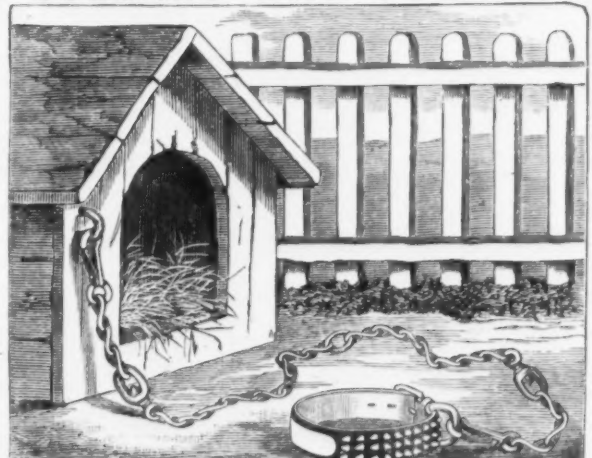
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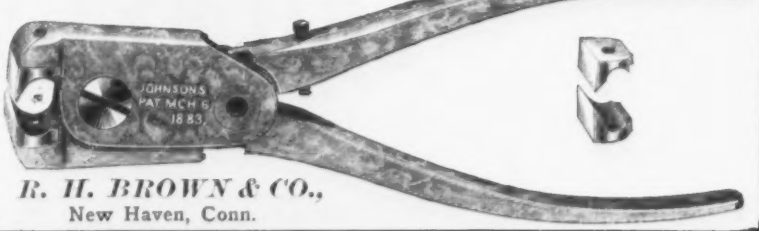
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IN THESE TOOLS ARE SUPERIOR TO ALL OTHERS,

AND WE SO WARRANT THEM.



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WHITE MOUNTAIN ICE CREAM FREEZER.

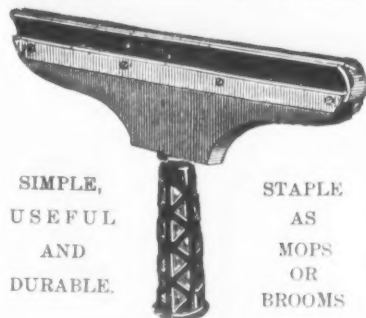


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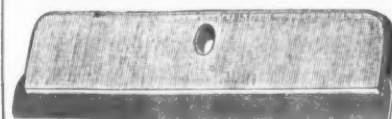


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Beware of Infringements.

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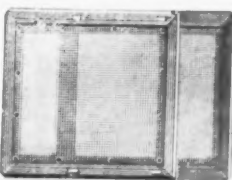
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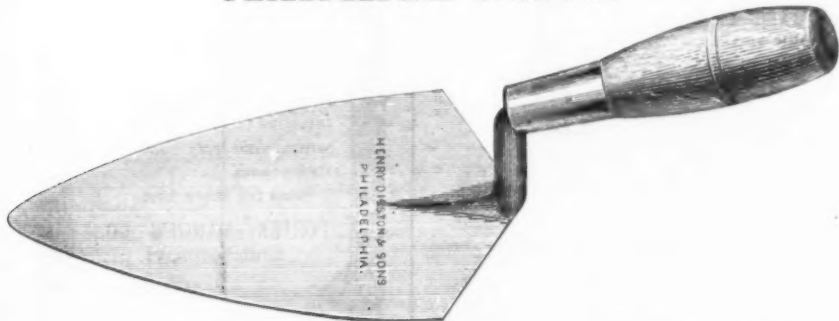
HENRY DISSTON & SONS,



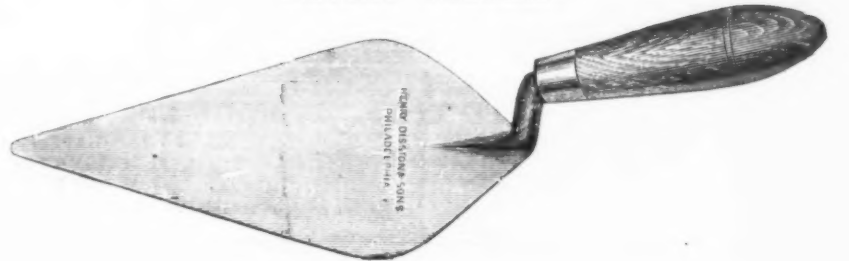
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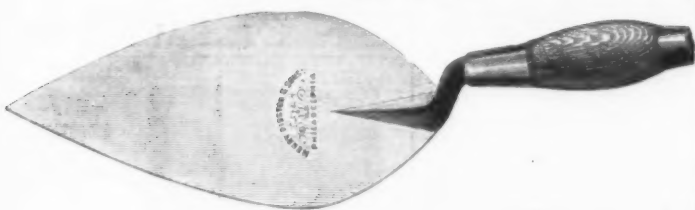
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Our Brick Trowels are made by a new process, which makes them a true taper from heel to point, giving them a spring and elasticity which none others possess. The handles are all made from white gum wood, which is more durable and less liable to split than any other wood, and with confidence we guarantee them to be the Best Trowels in the Market.

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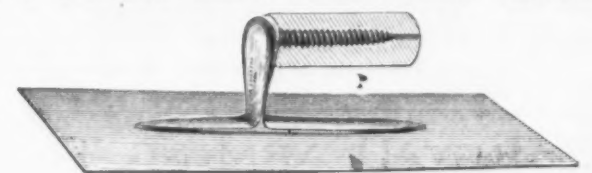
CUCUMBER PATTERN.



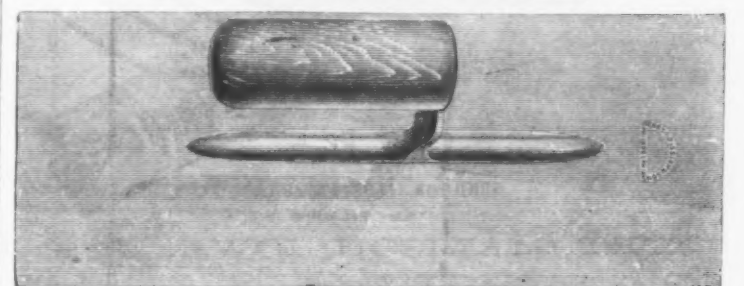
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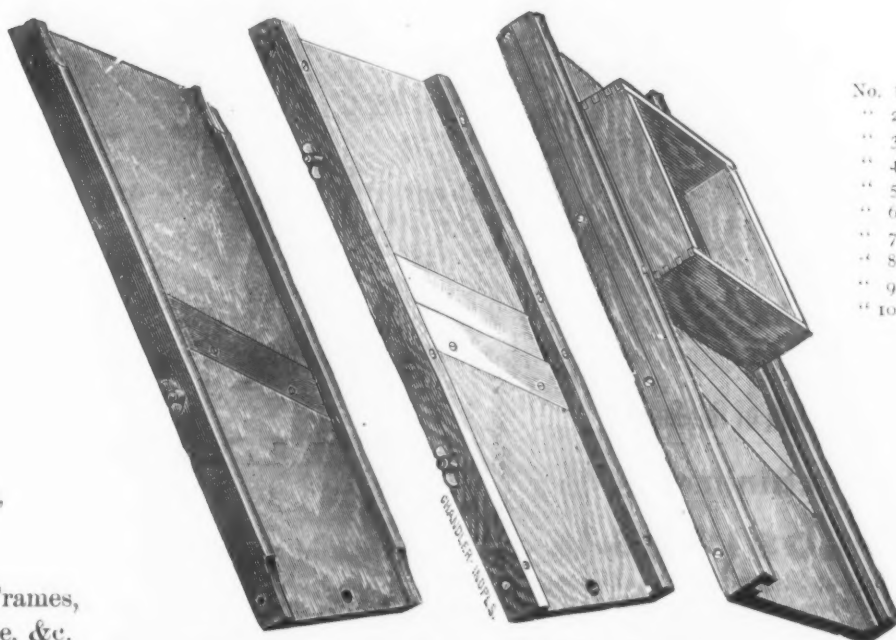
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" 6.	" 6 " " " "
" 7.	" 7 " " " "
" 8.	" 8 " " " "
" 9.	" 9 " " " "
" 10.	" 10 " " " "

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HEADQUARTERS FOR THE EASTERN AND NEW ENGLAND STATES FOR

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The above shows the size of the tablets and the size of the figures on them, and the above would read 15 cents, which would drop out of view upon registering the next sale.



DO YOU not endeavor to get money into your cash drawer, and did you ever think that after it had gotten there that you paid but little attention to it? Have you not often thought that you had paid out cash during the day and forgotten to charge the party with it? Did you ever hasten across the store to your clerk and ask him, "Did that man pay for the goods he is taking out?" If any of these things have happened to you, it will pay you to read over every word of this, which is endorsed by 500 of the most enterprising and prosperous retail merchants in the United States. If you say that you don't need a Cash Register, you, being ignorant of the facts, set up your opinion against 500 men who know all the facts. If you want something that will attract trade to your store; something that will make the services of your clerks more valuable to you and give them habits of exactness, buy a Cash Register. If you are the most enterprising man in your town, buy one of our Registers and reap the advantages of it, and sell enough of our machines during the next year, so that your commissions will more than pay for your machine. In a few minutes after the close of business each day you will know the exact amount of your sales. Cash or both cash and credit sales can be registered. Our largest machines are 20 inches wide, 24 inches high and 16 inches deep. It is adapted to all retail businesses. A touch on any one of the keys rings a bell, opens the drawer, records the amount of the sale on a wheel inside, and shows to the customer and salesman on an indicator above the amount of the sale. The prices of our Registers range from \$80 to \$200. We would not urge a man to take a \$200 machine whose business would only warrant the purchase of an \$80 Register.

Responsible Agents wanted in all Cities and Foreign Countries.

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NATIONAL CASH REGISTER CO.

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PERFECTION ROLLER SKATE.



The Celebrated
"PERFECTION"
RINK
ROLLER SKATE.
Average weight per pair, 2 pounds and 6 ounces.

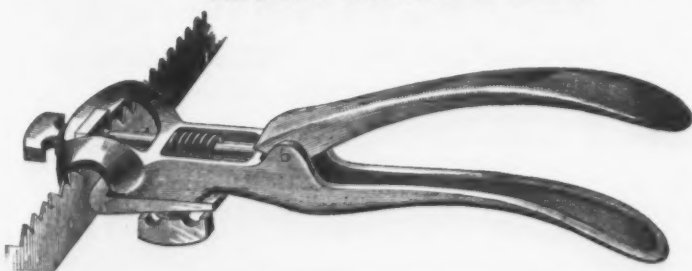
This Skate makes solid friends of every one who tries it, for its lightness, strength and extraordinary fine movement. It has the most perfect tension for adjusting the skate for plain or scientific skating, and has a direct-acting double cushion that does not crush or cut out, and will last a season without repairing, which no other skate will do. It positively has less parts and less repairs than any skate made. Each pair of skates will make two sizes by simply reversing the forward truck, and by reversing the rear truck it is especially adapted for beginners.

Send for Catalogue and Price List and sample pair. Liberal discounts to the trade.

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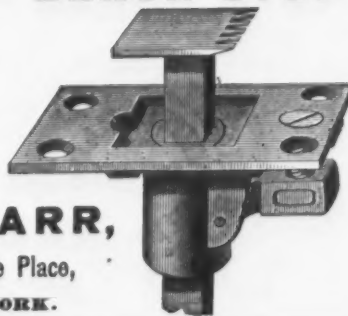
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"Automatic" Blind Awning Fixture.

ATTACHABLE TO OLD AS WELL AS NEW BLINDS ON FRAME OR BRICK HOUSES.

For Sale by all the Hardware Trade.

The very best Blind Hinge and a perfect Awning Fixture. No cloth to tear and wear out. No iron frames to shake and rattle. Blinds instantly converted to awnings. Awnings instantly converted to blinds. No skilled labor necessary to apply them. A child can operate them. Indispensable for Summer Hotels and Dwellings. Rooms always cool and shady. Many thousands in successful operation. Models furnished to architects.

F. O. NORTH & CO.

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H. F. SISE,

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GUARANTEED "GILBERTSON'S OLD METHOD" Extra Coated Roofing Plates.

In view of the fact that we guarantee the "Gilbertson's Old Method" to be a heavier coated plate than either "M. F." or "Old Style," and, if not found so, boxes to be held subject to our order, the following letter, recently received by this firm (unsolicited on our part), is of value, as it comes from a roofer having many years' experience:

GUARANTEED

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Dear Sirs: After 25 years' experience running a tinshop, doing roofing work, &c., I am free to say that I have never seen any plate that equals the "Gilbertson's Old Method" I have lately purchased of you. It is all you claim for it, and on my own buildings I shall use no other, and shall try and have my customers let me use it for them, as I consider it economy to do so.
Yours truly,
R. G. MARTIN.

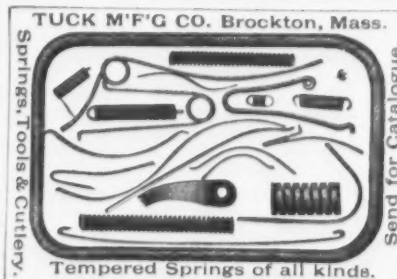
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LAWN MOWERS
GUARANTEED
BEST & CHEAPEST
LARGE REDUCTION
IN PRICE
HAND MOWERS
10 TO 20 IN.
HORSE MOWERS
25 TO 40 IN.
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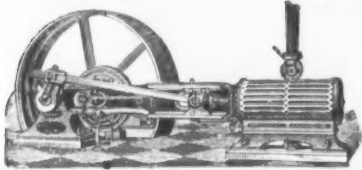
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Springs, Tools & Cutlery.
Tempered Springs of all kinds.
Send for Catalogue.



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PORTABLE MILLS AND MILL STONES.
Simplest and Cheapest in the Market.
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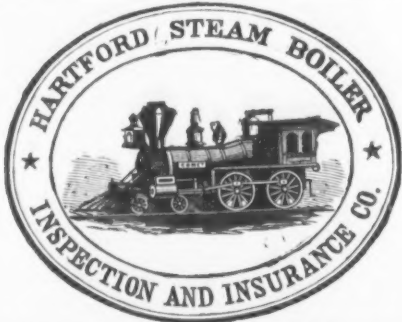
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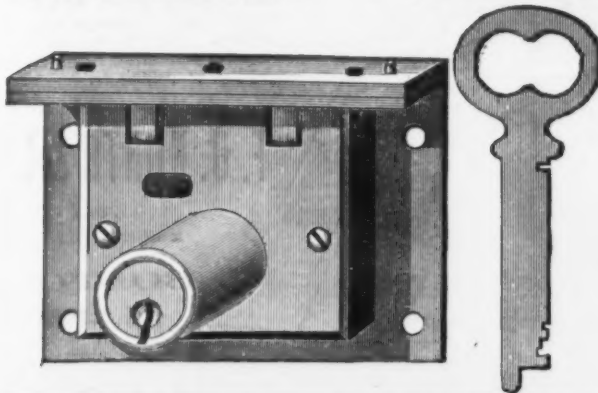
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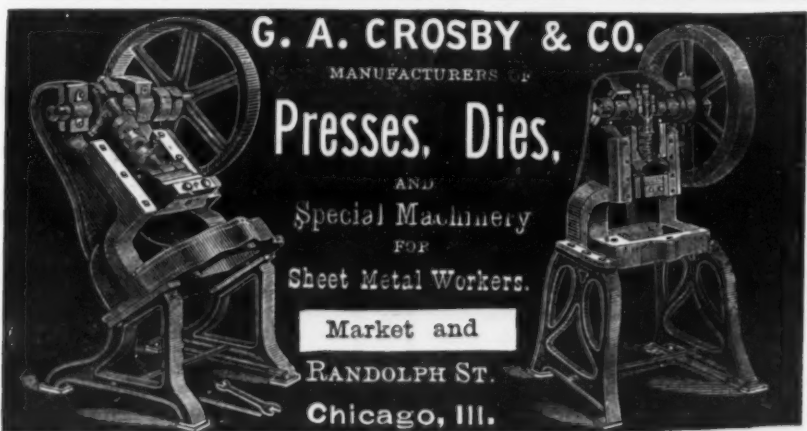
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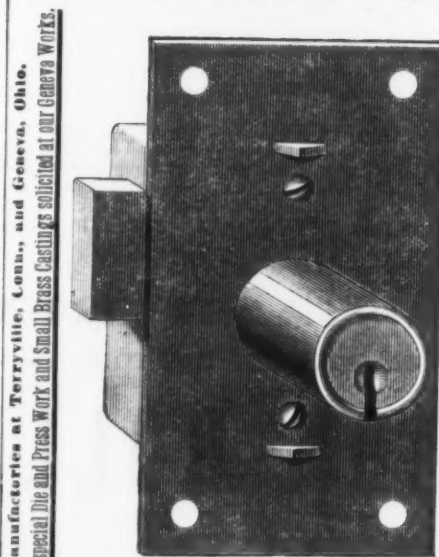


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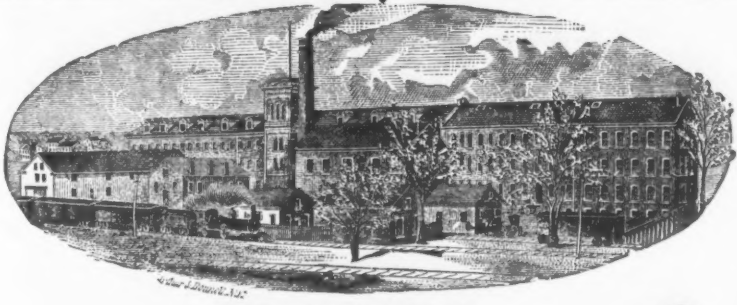
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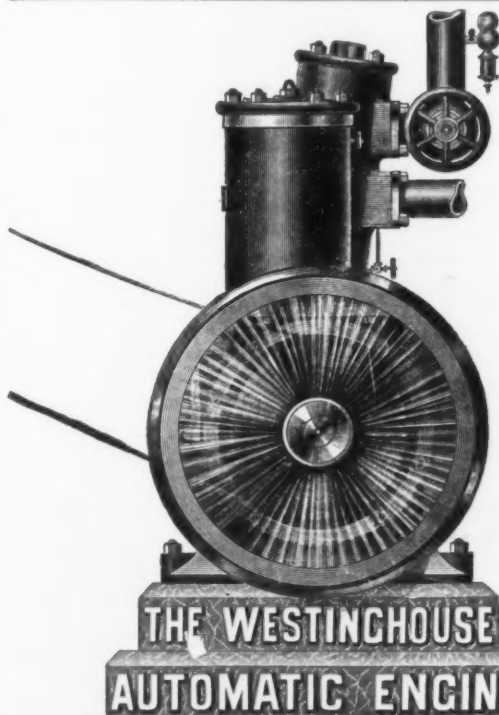
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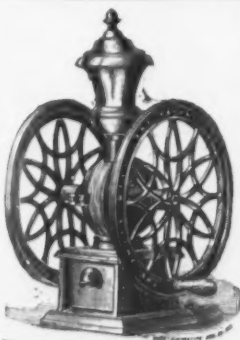
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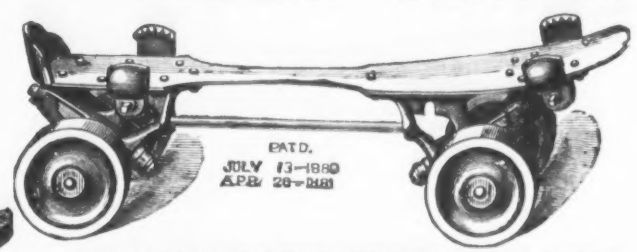
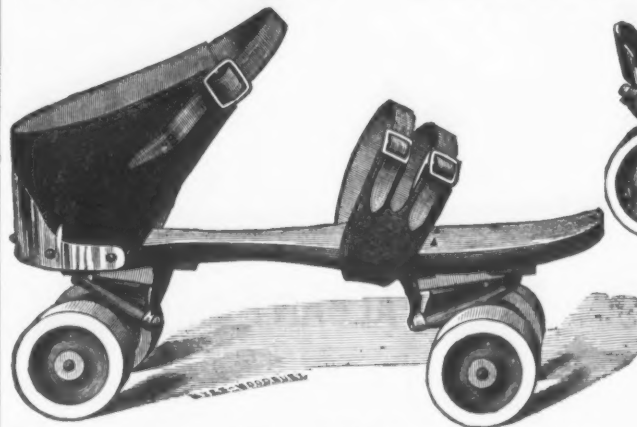
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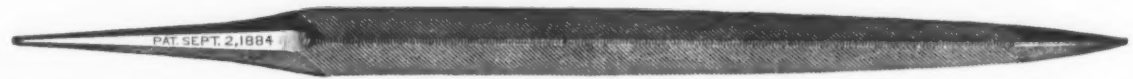
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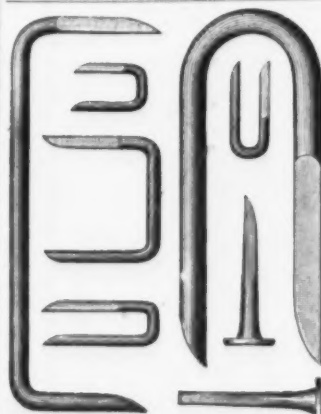
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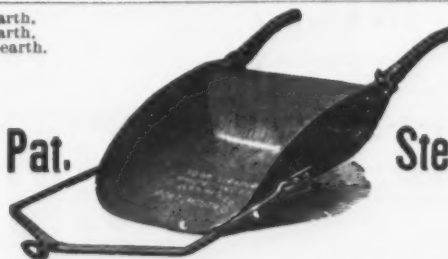
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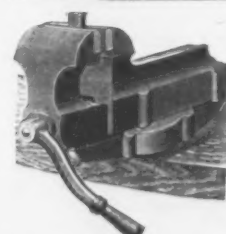
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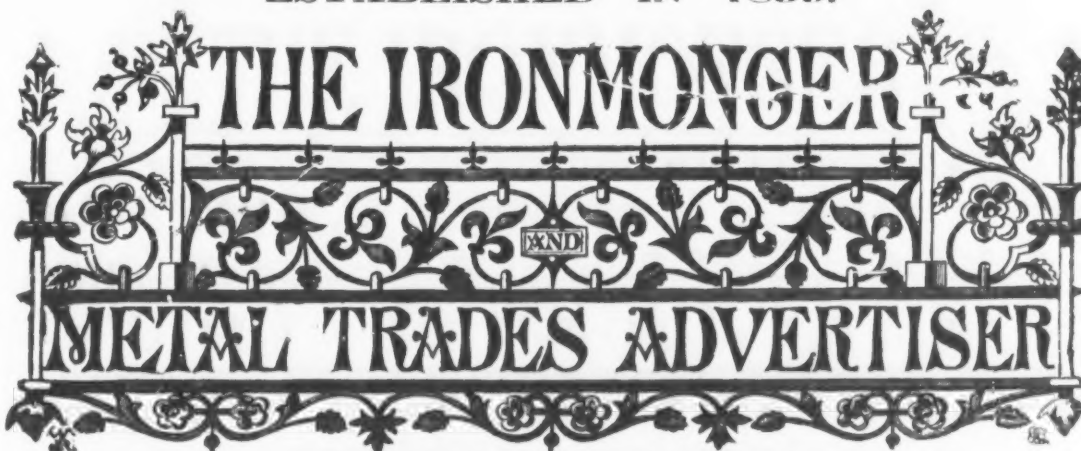
13 South Jefferson Street, Chicago, Ill.

WRITE FOR DESCRIPTION.

Eastern Depot, LINK BELT MACHINERY CO., 81 John St., New York.

THE LONDON IRONMONGER.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 42 CANNON STREET, LONDON, E. C.

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Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated. **Special Correspondents.**—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. **The Week. Legal News, Trade Notes, Bankruptcies, Foreign Notes, Colonial Settlements, Merchants' Circulars, &c.**, are each departments of the journal containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

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to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-subscribers at 75 cents.

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MAY 23, JUNE 20, JULY 18, AUGUST 15, SEPTEMBER 5, OCTOBER 3 and 31, NOVEMBER 28, DECEMBER 26, 1885, JANUARY 23, FEBRUARY 20, MARCH 20, and APRIL 17, 1886. This Supplement is published in

FOUR LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach, but in the native language of eighty millions of German, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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so far as our experience of more than twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger and Foreign Supplement* is a strikingly powerful and most efficient way of publicity, not to be compared with any of the other ordinary channels of communication.

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Now Sold by nearly
every Jobber in
the U. S.

NO OTHER
FREEZERS
EVER HAD SUCH A SALE.

of all competitors as can be imagined.
Send for Price List and Terms to the Trade.

MANUFACTURED BY THE

GOOCH FREEZER COMPANY,

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Hardware, Saddlery and General

Merchants,

AGENTS FOR

BALL BROTHERS'

SHEEP SHEARS.
McCoy & Sanders,

SOLE AGENTS,

26 Warren Street, New York.

THE MENEELY HARDWARE CO.,
WEST TROY, N. Y.

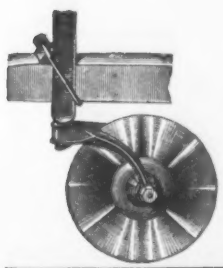
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 Snap-Links for chain adjusting and repairing.
 Rope Goods for horses and cattle, Breast Chains
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 SISE, GIBSON & CO., AGTS., 100 Chambers St., N. Y. City.
 Price List and Descriptive Catalogue sent free.

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ST. LOUIS, MO.,

MANUFACTURE ALL KINDS OF



CASTER AND ADJUSTABLE ROLLING COLTERS

FOR WOOD OR STEEL BEAM PLOWS

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AWARDED FIRST PREMIUM EVERYWHERE

20 DIFFERENT SIZES FROM \$2 TO \$100

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SMOKED BEEF SHAVER

MOLASSES

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COLD HANDLE SAD IRONS

SOLD BY ALL HARDWARE DEALERS

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MEAT CHOPPER

PEUGEOT FRÈRES,

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Finest Grades of Steel

FOR WATCH, CLOCK AND OTHER SPRINGS,
Band Steel for Saws for Metal and Wood. Steel for all Mechanical Uses. The
"Lion" Brand of Band Saws Best and Cheapest Made.
Correspondence Solicited.

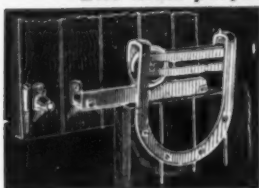
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AGENTS FOR UNITED STATES AND CANADA

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The most perfect Anti-Friction Hanger in the Market,



It is made of steel throughout, except the wheel, which has a steel axle. It will not break. It is practically free from wear. It is almost noiseless in action. It requires no oil. It has a broad bearing on the door, and keeps in line. It is by far the most durable. It may be used with any track. It is always in order.

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Is made of steel and is easily put in position. Catches and holds no snow or ice. Door hung thereon cannot jump the track. Is not subject to decay. Requires no fitting, but is ready at once. May be used with hangers of other manufacture.

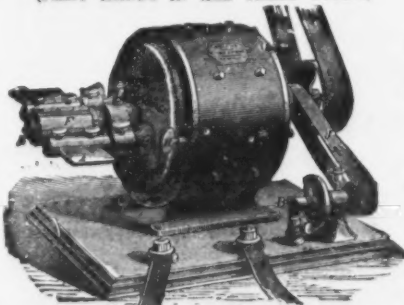
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NICKEL PLATING.

(FIRST HANDS IN ALL THESE GOODS.)

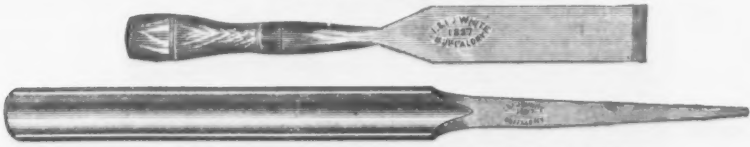
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Copper Salts,
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For Nickel, Bronze, Brass, Copper and Silver Plating. A greater number in use than all others combined.
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Established 1845.

Office, foot of Houston Street, East River,
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FIRE BRICK AND STOVE LININGS.

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FIRE BRICK

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DRAIN PIPE AND LAND TILE,

Woodbridge, - - N. J.

BORGNER & O'BRIEN,

MANUFACTURERS

FIRE BRICK

Edge Pressed Furnace Blocks,
CLAY RETORTS, TILES, &c.,

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Twenty years' practical Experience.

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Tiles, Blast Furnace Blocks, &c., and in a Special

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Successor to GARDNER BROS.,

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OF ALL SHAPES AND SIZES

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All dimensions constantly on hand. Fire

Bricks, Fire Shapes, Kaolin, Fire

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The Iron Age

Self-Binder.

PRICES.

Full Cloth, \$1.25

Half Roan, \$1.50

We are now prepared to supply our sub-

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We call attention to the low prices at which

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DAVID WILLIAMS,

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PEERLESS FORCE PUMP

HAS

Self-Adjust. ble Foot Rest

NEW AUTOMATIC COMPENSAT-
ING PACKING.

It will throw a continuous jet FROM
FORTY TO SIXTY FEET. A new pattern
jet and spray nozzle is sent with each
Pump.

Especially attention is called to the
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Pipe-Cutting Machines,

MANUFACTURED BY

PANCOAST & MAULE,

243 & 245 South Third St.,
PHILADELPHIA,

ARE

EFFICIENT,
POWERFUL,
CHEAP.

Send for Circular and Price-List.

No. 1—Hand Pipe-Cutting Machine, cuts 1/4 to 2 inches.

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No. 3—Power Machine, cuts 1/4 to 6 inches.

No. 4—Power Machine, cuts 1 to 4 in.

Cutting-Off Machine, cuts 1/4 to 4 in.



THE RUFORD OBLIQUE WHEEL

LANDSIDE SULKY PLOW

WITH POWER LIFT.

The only Sulky Plow built on correct
principles. All side and bottom friction of
the plow is relieved, and in consequence
the Buford Sulky draws one-horse
lighter than any other sulky or hand
plow made and doing the same work.

Send for circulars and prices to

ROCK ISLAND PLOW CO.,
SUCCESSORS TO
B. D. BUFORD & CO.,
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CORRUGATED

IRON
ROOFING
SIDING, CEILING,
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CINCINNATI
CORRUGATING CO.
+ CINCINNATI, O. +
SEND FOR ILLUSTRATED CATALOGUE.

CRIMPED

J. M. SCHOONMAKER.

MANUFACTURER AND SHIPPER OF

CONNELLSVILLE

Capacity of Mines, 2500 Tons Daily.

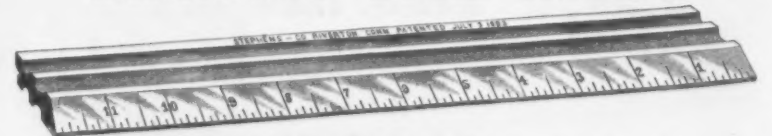
Siding connections with all lines of Railroads.

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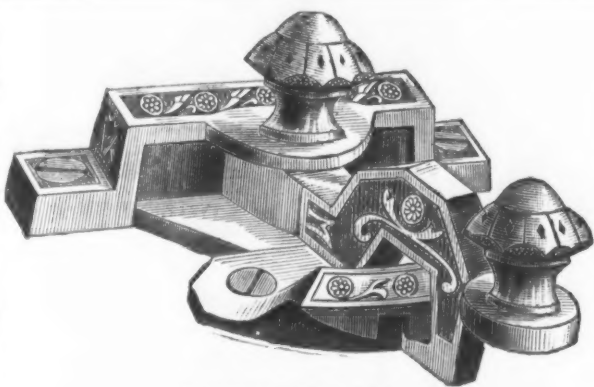
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STEPHENS & CO., Riverton, Conn., Manufacturers of
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Also, Exclusive Manufacturers of L. C. STEPHENS' PATENT COMBINATION RULE.
Send for Price List. Established in 1854

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BROUGHTON'S PATENT
Burglar-Proof Sash Locks.

Patented September 19, 1879.

Full Size.—No. 205.

Ornamental. Real Bronze, with Bronze Screws. Very Heavy. Our last Design.
PER DOZEN, \$3.36.

MANHATTAN HARDWARE CO.,

READING, PA., U. S. A.,
MANUFACTURERS OF
LOCKS of Every Description,
AND A FULL LINE OF
GENERAL BUILDERS' HARDWARE.

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The only manufacturers in the United States who quote bottom prices to all dealers without favoring any class.
Fine Gray Iron Castings of every description, also Real Bronze and Brass Castings, made to order at very low prices; Pattern Making, Japanning, Bronzing, Tinning, &c.
Our goods are known and liked wherever sold.
Orders received will be filled at last prices quoted in *The Iron Age*.
We do no underhand business, but quote alike to all for quantities less than \$1000.
Our terms are strictly 15 days, f.o.b. Reading, no charge for cases or cartage.
Orders can be sent with perfect confidence, as net prices are our standard.

THE "BUCKEYE" JUNIOR LAWN MOWER
MANUFACTURED BY
MAST FOOS & CO.
SPRINGFIELD, O.

It is a perfect title beauty.
The lightest running, best and cheapest Lawn Mower in the Market.
No experiment.
Great reduction in price.
10, 12, 14 and 16 inch cut.

Also Manufacturers of the
Buckeye Hose Reel and Lawn Sprinkler, Buckeye Wrought Iron Fencing, Buckeye Force Pump, and Iron Turbine Wind Engines.

Send for Circular and Price List.

Steel Door Hangers

FOR EVERY PURPOSE.



Anti-friction Steel Barn Door Hangers.
Three sizes of Steel Common Hangers.
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Heavy and Extra Heavy Anti-friction Hangers for Warehouses, Freight Depots, &c.
Anti-friction Steel Elevator Hangers for Iron or Wooden Doors.
Special shapes and sizes of Hangers made to order.
All Hangers made for either Iron or Wood Track.
Wrought-Iron, Lock-Joint, Round-Edge Hanger Track in any desired lengths and sizes.
Track Brackets, Stay Rollers, Combination Latches, Automatic Gate Hinges.
The most complete and finest line of these goods manufactured.
Prices the lowest. Catalogues and Lists on application.

SCRANTON MFG. CO., 68 to 74 W. Monroe St., Chicago.

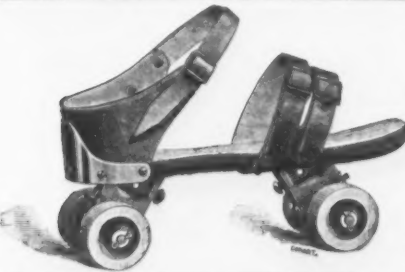
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LAWRENCE CURRY COMB CO.,

309 East 22d Street, New York.



Our line of Perfect Curry Combs is so well known it needs no comment. Also our Elevated Back Curry Comb (see cut) is rapidly growing in favor and offered at prices highly satisfactory to the Trade. We have just completed our Metallic Boring Machine, with Adjustable Handle or Crank, whereby a greater or less leverage can be obtained, as may be desired. Having made additional improvements in the Machine since its first introduction, we are enabled to offer to the Trade a Boring Machine possessing every advantage that a first-class machine should in merit and price.

LAWRENCE CURRY COMB CO.,
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"HARVARD,"

BEST IN THE WORLD.

Made of the very best materials; simple in construction; light and neat in appearance; noiseless in movement; easy to keep in order; finished in thorough and workmanlike manner; warranted to possess all the qualities and requirements necessary for any and all purposes where ROLLER SKATES ARE USED. Rubber Cushion held in Patent Adjustable Box, can be raised or lowered at pleasure to take up all wear.

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THE SCHEIDLER POST HOLE DIGGER.

Makes a hole any desired size.

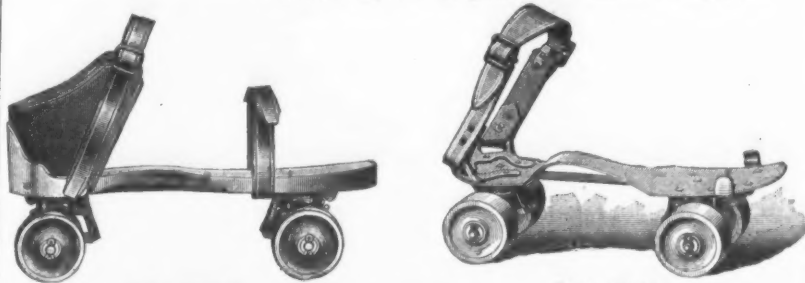
Works perfectly in all kinds of soil.

SIMPLE, RAPID, EASILY OPERATED AND DURABLE. DECIDEDLY THE BEST DIGGER MADE.

MYERS, HOUSEL & CO. Manufacturers, CANTON, OHIO.

Eureka Roller Skate.

SOMETHING NEW.

Ball Bearing and Ratchet Movement.
Most Easy for Beginners. Best for Experts.

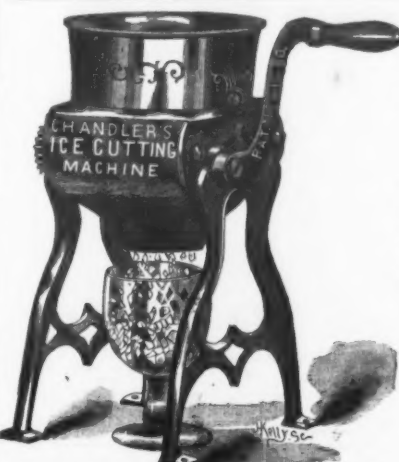
Rink Skate.

Club Skate.

MANUFACTURED BY

EUREKA SKATE CO., Richmond, Ind.

Send for Catalogue.



CHANDLER'S

Ice Cutting Machine.

We are aware that there are imperfect imitations of our machine in the market, and would ask your especial attention to the fact that the practical value of any Ice Machine consists in the curved or off-set teeth, through which the ice will readily pass by its own weight. This feature is fully protected by our letters patent, and cannot be used in any other machine.

GEO. H. MOSEMAN & CO.

Sole Agents,

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THE BEST POINT IN THE MARKET.

Our Goods are Warranted Perfect.

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Thos. A. Edison, President.

Chas. Batchelor, Treasurer.

H. W. Lator, G'l Mgr.

Edison Shafting Mfg. Co.

MANUFACTURERS OF

TURNED STEEL & IRON

SHAFTING,

Couplings, Hangers, Pulleys, &c.

Also Agents for the Sale of
COLD-ROLLED STEEL SHAFTING
made by Gaultier Steel Dept. of Cambria Iron Co.OFFICE AND WORKS
At 86, 88 and 90 Goerck St.,
New York.

J.F. WOLLENSAK'S PATENT TRANSOM LIFTER AND LOCK
FOR ALL KINDS OF TRANSOMS, PANLIGHTS, SKYLIGHTS.
SEND FOR CATALOGUE AND PRICE LIST.
J.F. WOLLENSAK, CHICAGO, ILL.

PORTABLE FORGES.

Send for Catalogue to

EMPIRE PORTABLE FORGE CO.,
COHES, N. Y.

ROOFING.

For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free. Agents wanted.
T. NEW, 32 John Street, New York.

E.W. CARR & CO.
READY ADDRESS
ENVELOPES
AND WRAPPERS FOR
ALL LINES OF TRADE
16 CALHOUN PLACE
110 CLARK STREET CHICAGO, ILL.

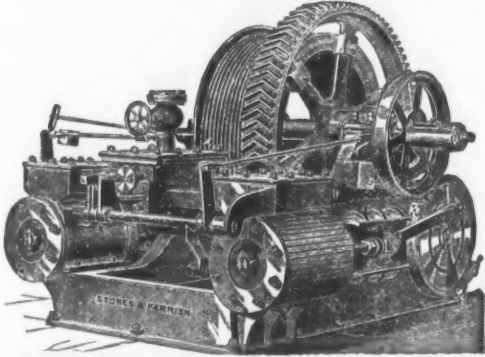
STEAM SAW
BOILERS' EMPIRE ENGINES' MILLS
—PORTABLE AND STATIONARY—
SCHOFIELD'S PREMIUM PRESSES
FOR PACKING COTTON AND HAY
ILLUSTRATED PRICE LIST ON APPLICATION.
J.S. SCHOFIELD & SONS, MACON, GA.

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Handle.....	dis 40
Staple Knives.....	dis 40
Lap Roller, Oval Handle.....	dis 40
Staple.....	dis 40
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Shoe Knives, Wood's.....	dis 40
Dividers.—Cook's.....	dis 20
Dog Collars.....	dis 20
Door Springs.—1 cr Rod.....	dis 1.00
Imitation Torrey's Rod.....	dis 1.00
Gen Coil, new list.....	dis 50
Warner's.....	dis 2.00
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Drawer Knobs.—Thurston's.....	dis 20
Drills.—Morse Bitt Stock.....	dis 40
Morse Straight Shank.....	dis 40
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Valpole Emery Mills.....	dis 1.00
Turkish, in 10 b cans.....	dis 1.00
Enamelled Ware.—	
Standard Mfg. Co. Kettles.....	dis 40
Standard Sauce Pans.....	dis 40
Felice Plates.—Wrought.....	dis 40
Files.—American File Co.....	dis 40
Nicholson File Co.....	dis 40
Fluting Machines.—Knox List, \$4.00.....	dis 20
Forks.—W. C. & Co. Manure.....	dis 40
Eastern Tool Co.'s, Manure.....	dis 40
Gimlet Bits.....	dis 40
Genuine German, No. 125, 132 to 8-32.....	dis 1.00
Pierce's.....	dis 1.00
Class Cutters.—Combination Glass Cutter	
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Hammers.—Maydole's.....	dis 15
Hartford Hammer Co.....	dis 20
Hangers & Rollers.—Anti-Friction.....	dis 50
Acme Rollers.....	dis 50
Common Hangers.....	dis 50
Common Rollers.....	dis 50
Victor Hangers.....	dis 50
Victor Rollers.....	dis 50
Hand Screws.....	dis 10
Hatchets.—C. F. Dowse, new list.....	dis 20
Underhill.....	dis 20
Hay Knives.—Lightning.....	dis 18.00
Hinges.—Strap and T (new list).....	dis 60
Providence Plate.....	dis 10
Wrought Screw.....	dis 60
Hoes.—Eastern Tool Co.....	dis 60
W. C. & Co's.....	dis 60
Hooks and Staples.—Brewers (new list).....	dis 70
Horse Nails.....	dis 70
Putnam Pointed.....	dis 20
Bridgewater.....	dis 20
Ice Cream Freezers.—Packer's, new list.....	dis 50
Knobs.—"Norwalk." New list.....	dis 60
Silver Glass.....	dis 50
Silver Glass Bell Pulls.....	dis 50
Lanterns.—Tubular, No. 0.....	dis 7.50
Lawn Mowers.....	dis 40
Continental.....	dis 40
Quaker City.....	dis 40
National.....	dis 50
Lead.—Sheet.....	dis 30
Pipe.....	dis 30
Locks.—Norwalk.....	dis 60
Eagle Cabinet.....	dis 40
Eagle Trunk.....	dis 15
Mallory, Wheeler & Co.....	dis 60
Manure Forks.—W. O. & Co.....	dis 40
Eastern Tool Co's.....	dis 40
Mattresses.....	dis 40
K. P. & Co. Long Cutter, \$10.00.....	dis 50
K. P. & Co. Short Cutter, \$10.00.....	dis 50
K. P. & Co. Pick Cutter, \$10.00.....	dis 50
Measuring Tapes.—Eddy's.....	dis 20
Meat Cutters.—Miller's Challenge.....	dis 30
Hale's new list.....	dis 40
American.....	dis 30
Money Drawers.—Tucker's Alarm.....	dis 30
Mouse Traps.—Delusion.....	dis 1.25
Novelty.....	dis 20
Nails.....	dis 20
Oliver's—Zinc and Tin.....	dis 60
Brass and Copper.....	dis 50
Ox Hoes.—Extra finished.....	dis 10
1 1/2 in. x 2 in. pair.....	dis 7.00
1 1/2 in. x 2 in. pair.....	dis 7.00
1 1/2 in. x 2 in. pair.....	dis 7.00
Paper.—Common Tarred Sheathing.....	dis 15
Eagle Brand Tarred Sheathing.....	dis 15
Common, Dry Sheathing.....	dis 15
Eagle Brand Dry Sheathing.....	dis 15
Picks.—K. P. & Co. Adze Eye, 6 to 7 1/2.....	dis 10
K. P. & Co. Adze Eye, 6 to 7 1/2.....	dis 10
Planes.....	dis 20
Auburn Tool Co. Bench.....	dis 20
Auburn Tool Co. Bench.....	dis 20
Auburn Tool Co. Bench.....	dis 20
N. Y. Tool Co. Bench.....	dis 20
Plated Varn.—Rogers & Bro.....	dis 50
Pliers.—Vorn Clasp & Co.....	dis 10
Butler's Wire Pliers.....	dis 10
Plumb & Levels.—Stanley & L. Co.....	dis 70
Potato Diggers.—W. C. & Co. reduced list.....	dis 40
Eastern Tool Co's.....	dis 40
Pulleys.—Acme or Excelsior, 1 1/2 in.....	dis 22
Acme or Excelsior, 2 in.....	dis 24
Pulley Blocks.....	dis 30
Pumps.—Union Manufacturing Co.....	dis 50
Iron Clatern.....	dis 50
Iron Pitcher Spout.....	dis 60
Copper.....	dis 50
Rivers.—Black (new list).....	dis 40
Carriage in 10 b papers (new list).....	dis 40
Copper.....	dis 50
Razors.—Torrey's.....	dis 20
Rules.—Stanley, Boxwood.....	dis 10
Stanley, Ivory.....	dis 10
Sad Irons.—Common.....	dis 30
Laundry.....	dis 30
Tailors'.....	dis 30
Enterprise "Potts".....	dis 30
Sash Locks.—King & Hutchinson's, new list.....	dis 40
Sandpaper.—Baeder & Adamson.....	dis 40
Sash Weights.—Patent Eye.....	dis 14
Saws.—Hand Saws, Diston's.....	dis 20
Cut Saws.....	dis 20
Diston's, Common Tooth.....	dis 40
Diston's Great American Tooth.....	dis 40
Boynton's Lightning Tooth.....	dis 40
M. B. & D. Hand Saws.....	dis 30
Richardson Bros.....	dis 30
Saw Blades.—Diston.....	dis 20
Welch & Griffith, Extra.....	dis 20
Welch & Griffith, No. 2.....	dis 20
Scales.—Fairbanks.....	dis 20
Screws.....	dis 20
Flat-Head Iron.....	dis 20
Flat-Head Brass.....	dis 20
Round-Head Iron.....	dis 20
Round-Head Brass.....	dis 20
Griffin Round-Head Nickel Plate.....	dis 20
Scythes.—Clippers in boxes.....	dis 20
Shaves.—Kimball's.....	dis 20
Watrouts.....	dis 20
Shears.—American Shear Co., new list.....	dis 20
Sheet.—Tatham's.....	dis 20
Shovels.—O. Ames, new list.....	dis 20
O. Ames, other brands, new list.....	dis 20
Sinks.—Magne Patent.....	dis 20
Snow Shovels.....	dis 20
Skates.....	dis 20
Union Roller.....	dis 20
Stocks and Dies.—King's.....	dis 10
Trucks.....	dis 20
Swedes Tinned.....	dis 20
Swedes Iron.....	dis 20
Gimp and Lead.....	dis 20
Copper Tacks.....	dis 20
Onelia, Genuine.....	dis 20
Onelia, Imitation, H. & N.....	dis 20
Blake's.....	dis 20
Vises.—Simpson's Adjustable.....	dis 20
Howard Vise Co.....	dis 20
Frontals.....	dis 20
Weather Strips.—Packer's.....	dis 20
Brown's Flexible Rubber.....	dis 20
In 20 feet boxes No. 1, 1/2 in. wide, 1/2 in. high.....	dis 20
No. 2, 1/2 in. wide, 1/2 in. high.....	dis 20
Back Walnut Spring Weather Strips.....	dis 20
Window Springs.....	dis 20
Babcock's No. 3.....	dis 20
Babcock's No. 4.....	dis 20
Wire Cloth.—Clintons.....	dis 20
Wire Fence.....	dis 20
Washburn Painted Barbed.....	dis 20
Washburn Galvanized Barbed.....	dis 20
Wire Goods.—Gate Hooks & Eyes, &c.....	dis 20
Wrenches.—A. G. Coe's.....	dis 20
Girard Mfg. Co.....	dis 20
Girard Ael.....	dis 20
"Always Ready".....	dis 20
Wringers.....	dis 20
Novelty for Common Tube No. 2-10 inch.....	dis 20
Excelsior for Stationary Tube No. 2-10 inch.....	dis 20
Excelsior for Stationary Tube No. F. 11 inch.....	dis 20
Excelsior with Folding Bench No. A-10.....	dis 20
Excelsior with Folding Bench No. B-11.....	dis 20
Novelty Set Tub.....	dis 20
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Keystone, Iron Frame No. 2 1/2.....	dis 20
Zinc.....	dis 20

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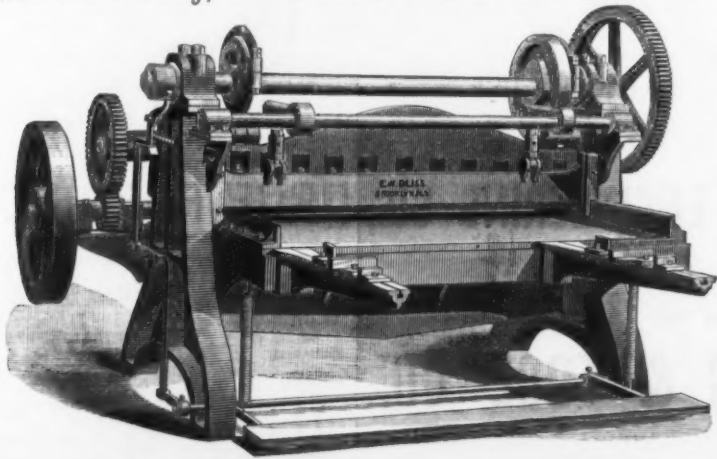
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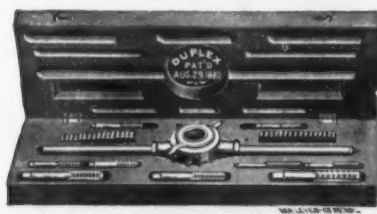
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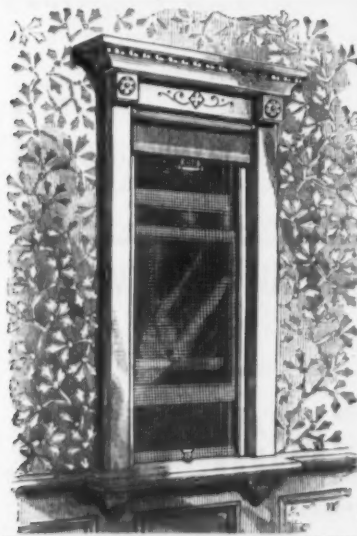
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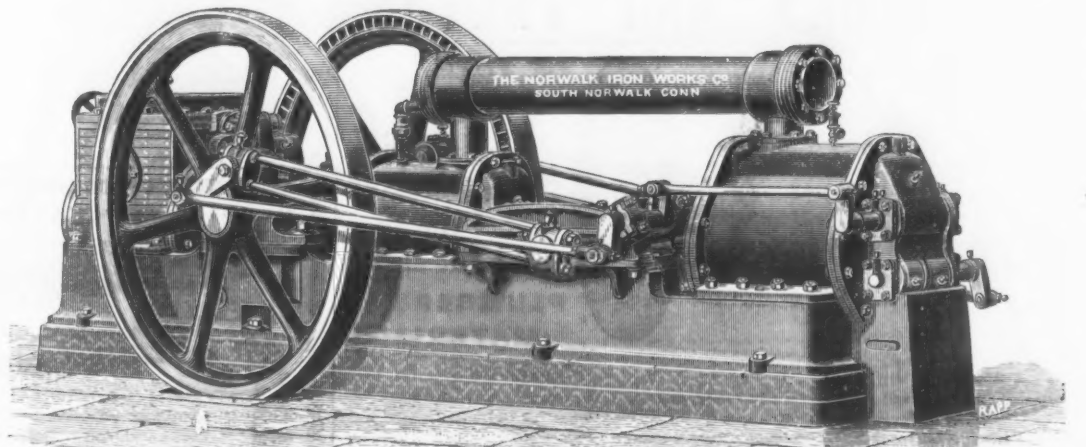
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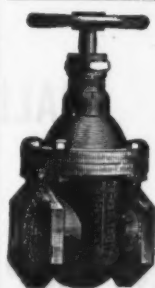
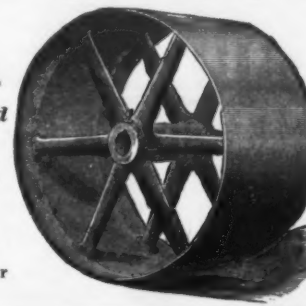
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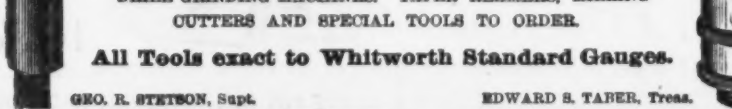
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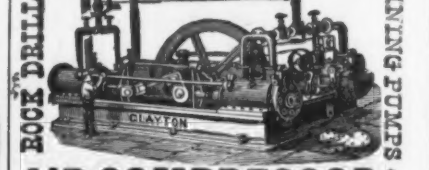
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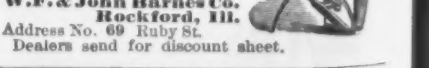
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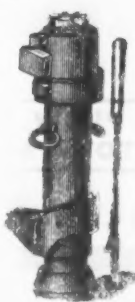


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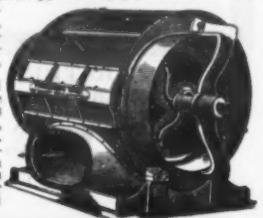
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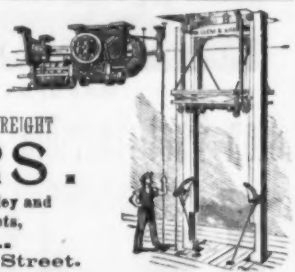
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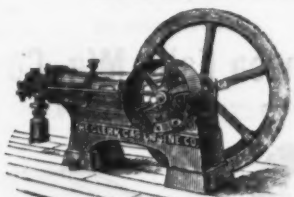
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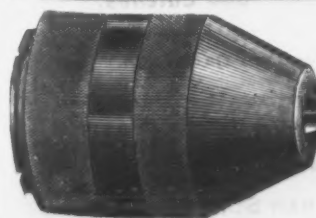
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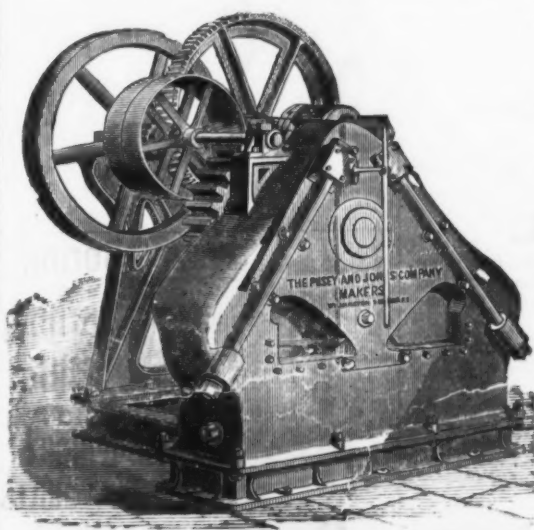
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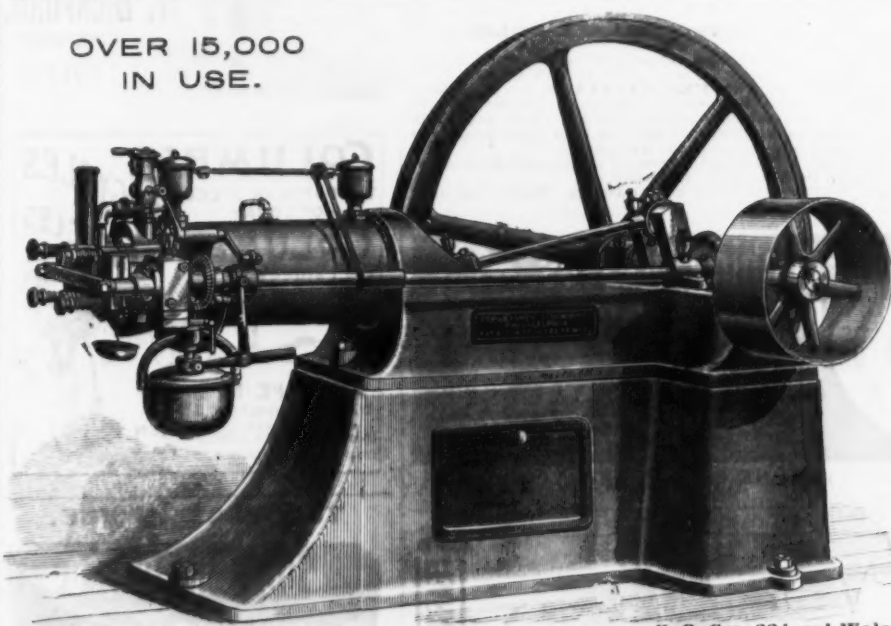
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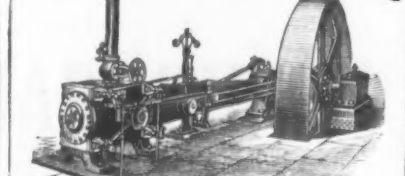
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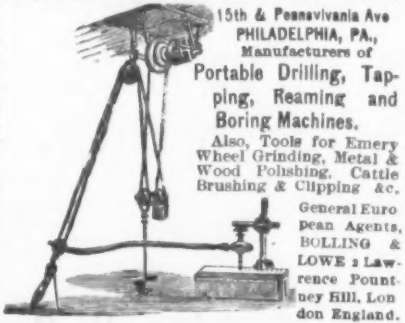
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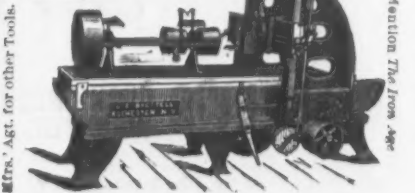
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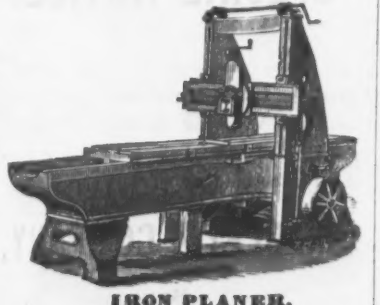
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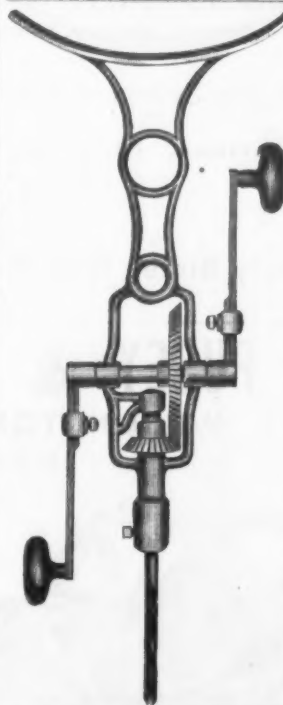
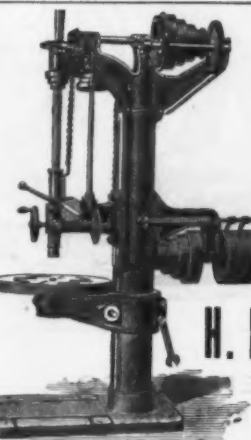
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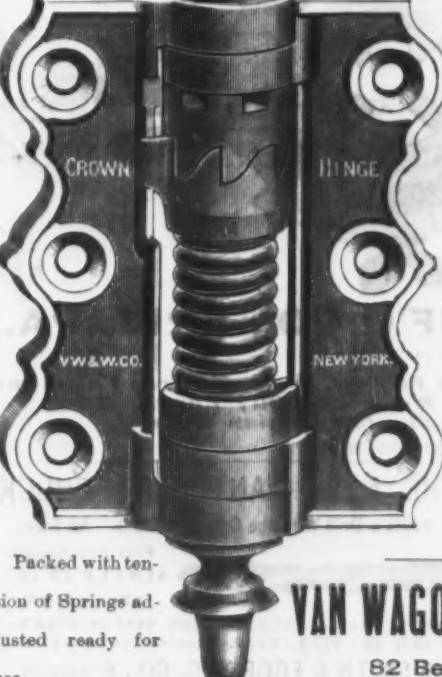
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